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WOOD MAGAZINE  WINTER 1998
A Clever Spin On My Woodworking-Scrapbook Idea

I just love it when something I write for WOOD magazine serves as an idea starter for you readers. In fact, that’s what it’s all about for all of the WOOD magazine gang. It seems like no matter what kind of idea we come up with, one of you suggests something that makes it even better. That’s terrific!

A few days ago I was rummaging through my in-box and happened onto a letter I got from Bob Vincent, a first-year woodworker from Pawtucket, Rhode Island. And a beauty it was!

This enterprising woodworker not only had read my editor’s column in issue 103 suggesting that readers record their woodworking heroics by taking photographs of their projects, he went the extra mile. The result: a 6-page newsletter titled “Sawdust and Splinters (the first page is shown above). Bob says here’s newsletter creator and first-year woodworker Bob Vincent relaxing in his Pawtucket, Rhode Island, workshop.

The first page of Bob Vincent’s well-done woodworking newsletter

it’s a great way to keep his family and friends current on what he’s up to in the shop.

I really enjoyed reading about your exploits, Bob, and I’m hoping a lot of our readers will follow your excellent lead. Thanks for sharing your idea.

To find out how Bob molded his computer, woodworking, and photography skills into a super-impressive newsletter, send a self-addressed stamped envelope to WOOD magazine, Woodworking Newsletter, 1716 Locust Street, GA310, Des Moines, IA 50309-3023. We’ll send you Bob’s instructions for how to create your own.

Larry Clayton

Wood Profiles, a popular section from the latest WOOD SHOW ONLINE, has moved to a permanent home at WOOD ONLINE. Adapted from the well-liked Wood Profile features in WOOD magazine, each online article focuses on a single woodworking wood. Each Wood Profile describes a species, tells a bit about its history in woodworking, and discusses its uses and availability. In addition, you’ll find tips and techniques aimed at helping you work successfully with the particular stock, along with some handy general woodworking tips.
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**Talking Back**

**Wanted: Internet woodworkers**

Your WOOD SHOW ONLINE® is absolutely great. I'm very impressed by your achievements to combine your publication and instruction with new technologies. I sincerely hope there will be many WOOD SHOWS ONLINE to come.

The company that I work for has developed a system for education over the internet. It's called the LearningWeb. The LearningWeb delivers cost-effective training at the user’s convenience. There’s no mail to wait on. Simply log on and continue with your courses at your own pace and schedule. The LearningWeb also provides testing, certification, and security for teachers and their materials.

Currently the system includes hundreds of courses with varying content from algebra and computer programming to buying a new car and coaching basketball. As of yet, there are no woodworking courses. I am confident that woodworking training can be delivered over the internet very effectively.

All we need are some instructors and students. If you would be interested in either, please check out our web site at: www.learning-web.com

—Dan Steiner, Interchange Technologies and Learning

---

**Scrollsaw basket pattern revised**

I enjoyed the article on scrollsaw baskets in issue #107 of WOOD magazine. I did notice a small error that could lead to some problems.

In the full-size pattern for parts C and E, the centerline used to match up the halves of the pattern with parts B, D, and F isn’t in the center. The line should be moved up about \(\frac{1}{8}\)" so that it goes through the middle of the beads, as shown below.

—Bob Harker, Terre Haute, Ind.

---

**Speak your mind**

We welcome your comments, criticisms, suggestions, and yes, even compliments. We’ll publish letters of the greatest benefit to our readers. Write to: Talking Back, WOOD Magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023.
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**John McAllister Jr.** did. John, a 73 year old North Carolina native, and self taught wood worker for the past 31 years, researched and built this Goddard-Townsend secretary.

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New cutting diagram for the five-drawer chest
You may have noticed in the five-drawer chest project featured in issue 110 that we accidentally duplicated the cutting diagrams on pages 68 and 69. Shown below is the correct cutting diagram for page 69. For future reference you may want to clip and paste this diagram over the one on page 69. We apologize for this inconvenience.

Is your shop covered?
Your December issue had an article about turning your woodworking hobby into a business. The article left out one very important subject: insurance. Most homeowners policies include coverage for your personal contents, which would include tools. Problems begin when you use your tools for a business. All homeowners policies limit the coverage for “business use” items, usually to only $2,500 on premises and $250 away from your home. The homeowners policy also excludes product-liability coverage for anything that you sell.

Many people think that because they don’t make a profit, or that they do it “on the side,” that they don’t have a business. The policy defines a business very liberally, and doesn’t limit it to one that makes a profit or is the primary occupation. If a friend asks you to make him a table and pays you $100 to help cover the cost, I don’t think that you are yet a business. But, if you sell a bunch of tables at a craft show, I think you are.

Homeowners policies also include coverage for detached structures, like garages and workshops. The coverage is usually limited to 10% of your home’s coverage. For example, if you insure your home for $250,000, they would automatically include $25,000 for detached structures. However, the policy excludes this coverage for other buildings if they are used for business activity. I highly recommend that woodworkers who sell their products consult with an insurance agent to make sure they are covered.

Fortunately there are fairly inexpensive ways to get coverage for your business. Many companies offer Home Enterprise Policies for people working out of their homes. These policies usually have a premium of $200-$300 a year, but some won’t write a woodworker onto this type of policy. Many companies also offer Business Owner’s Policies that start at about $350 a year. This policy would cover your tools, shop, equipment, and product liability.

Keep in mind that all policies still require that you prove your loss. If your router is stolen, the claims adjuster needs to know that you actually owned the router. They do understand that we don’t always have receipts for all that we own, so they will usually accept owner’s manuals, returned checks, credit card statements, photos, or videos. I recommend taking a video of your shop. While taping, comment on when and where you purchased certain items, and what their value is. Reshoot the video once a year, and keep it and all owner manuals in a safe deposit box.

—Willy Hoffman Jr.,
Certified Insurance Counselor, Washington, D.C.
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Ford F-Series

*Based on MSRP comparison of Chevrolet and Ford base models.
For great-looking projects

GO FIGURE

Figured stock brings eye appeal to projects. Green dye stain (water-based aniline dye, in this case) accentuates the curly maple figure in the jewelry box.

Figured wood gives your projects pizzazz. These tips will help you work successfully with this sometimes uncooperative material.

Figured stock brings excitement to woodworking in more ways than one. Wood figure, such as the dramatic, glowing waves of curly maple on the green jewelry box above and the striking beauty spots of bird's-eye maple in the sides of the picture frame and the car's body, can turn a project from ho-hum to hoorah.

But this visual excitement comes at a price—the sometimes hair-raising experience of working with unruly material.

Figure on some workshop challenges with this stock

The very thing that gives figured wood its beauty—grain that twists and turns its way through a board—makes it demanding to work with.

One of woodworking's basic rules—go with the grain—still applies when jointing or planing figured stock. But it becomes more difficult to follow with figured stock.

In the curly maple board below center, for instance, the grain in the vicinity of the pen point appears to run to the left. Under the ferrule on the pen, however, a fold in the grain lines seems to indicate the opposite grain direction—at least for a short distance.

When surface-planing or jointing figured stock, make your best determination of grain direction. Then, adjust your machine to take a light cut—maybe ½" or even ¼". (Needless to say, the knives must be sharp.) Feed the stock steadily at a moderate speed, then check the results.

If you see a lot of chip-out and torn grain, as in the pieces of stock below, try running the material through the machine in the other direction. A lighter cut might help, too. For final machining, choose the feed direction and depth of cut that gives the cleanest results, and mark your stock so you'll always feed it through the same way.

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Easily slices rigid materials like floor tiles, linoleum, carpet, plastic and leather.

The Fein MultiMaster is a true multi-purpose tool that saves hours of time. With the MultiMaster, finishing is just the beginning.

Finishing is just the beginning.
proves most effective. Drum surface sanders handle irregular grain with greater aplomb than thickness planers.

The ornery grain of figured wood can make sawing troublesome, too. You'll make your best cuts on figured stock by installing a zero-clearance insert in your tablesaw's throat. And when crosscutting, back the stock with scrapwood to prevent chip-out on the exit side of the cut. You'll want a sharp blade here, too.

A good approach to machining parts from highly figured stock is to cut all parts slightly oversize, then sand or plane them to finished size. A low-angle block plane like the one shown left does a great job of planing figured wood.

Keep the figure in sight when finishing your wood
Sand figured wood to about 180 grit. Sanding to finer grits won't bring out the figure any better, and may actually lessen its impact.

Here's a method that produces a beautiful figured surface. First, sand to 120 grit. Then, instead of further sanding, clean up the surface with a cabinet scraper as shown left. The scraper's edge, when properly dressed, shaves the wood down to a smooth, glassy surface without tear-out. (We follow this procedure on figured wood and burls in the WOOD® magazine shop.)

When you must stain figured wood, rely on dye stains. While pigment stains can highlight figure, they also can obscure it if applied too thickly. Dye stains accentuate the figure more effectively than pigmented stains, no matter how dark the stain color. Gel stains usually mask the figure.

A clear, film-forming finish, such as varnish or lacquer, enhances the depth of a figured surface. This can give it a more dramatic appearance.®

Written by Larry Johnston with Chuck Hedlund  Photographs: Hetherington Photography
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Will Selling Your Work Ruin a Fun Hobby?

When something you've loved to do all your life, such as woodworking, starts turning into a business, it can be great—or quickly become a problem.

Going to your workshop to relax after a hard week on the job (or to stay productive in retirement) is a far cry from dragging yourself there to fill an overdue contract or satisfy a mean-spirited customer. It's actually the difference between pleasure and drudgery.

Selling your work doesn't have to wreck your hobby or retirement, though. With the right attitude and guiding strategies, you can combine a rewarding pastime with a nice income.

Decide what you want your woodworking to do

To keep woodworking an enjoyable pastime and make some money with it, set a goal before you sell your work. Decide whether you'll sell your projects to (a) help pay for your hobby, (b) provide extra cash for vacations, etc., or (c) support your family.

Arriving at a goal decision is more than a glance-at-the-ceiling exercise. The Internal Revenue Service may someday want to know why you're doing what you're doing in order to determine whether it has hobby or business status for tax purposes.

If you're counting on woodworking to provide a full-time income, you might have to sacrifice some of your woodworking enjoyment—at least temporarily. You'll have to make pieces you don't enjoy so much, work longer hours than you want, and deal with difficult customers.

It's a different matter if you just want some cash to upgrade your tools or pay for an extra-special trip. Then, you can afford to be choosier about your products and your customers.

Either way, if you do quality work, the positive word-of-mouth advertising generated by sales will someday force you into a problem—more work than you can handle. How you deal with that also affects how much you'll continue to enjoy woodworking.

Raise prices to keep growth manageable

A backlog of a month or two is manageable for most woodworkers. Once the backlog grows beyond that, however, you're doing both yourself and your customers a disservice.

To keep your woodworking load manageable, raise prices. But some woodworkers have trouble with this, especially in the first few years of selling work.

Unfortunately, many woodworkers sell their work at close to cost, which makes little sense. Woodworkers are some of the nicest and humblest people around. That's why they often shy away from setting prices others may feel are extravagant. You shouldn't worry about that.

There's one possible backlash from raising prices. Some woodworkers report that when they did, demand for their work actually rose. Customers who before didn't think they did quality work suddenly see them in a new light.

That's a problem you can profit from. Just raise prices again until your workload jibes with your comfort level.

Other options to control your workload

It could be you're making small-ticket items that just won't bear a price increase. Then, think about moving into a new, more profitable niche. Generally, you'll make the best money on items that are the most unusual, creative, or customized. And you probably won't have to make as many of them.

Other solutions to keep your enjoyment high and still handle a growing workload are to hire an employee or contract out the time-consuming work, such as sanding or finishing. These options, though, are the most dramatic and complex ones you can take. They inevitably make you more of a manager and less of a woodworker. That's also the point at which your hobby really becomes a business, and it's a step you should take only if you're committed to making woodworking your livelihood.
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Woodworker's Journal, January/February 1998

Regarding our quick-change 2-knife system with two high-speed steel, double-edged, reversible knives: "...quick-change knives that we found easy and accurate to install. We found that with the quick-change systems we aligned the knives within .001. And, we could install both knives in about five minutes." "Editors' Choice Top Tool™"  

Better Homes & Gardens® Wood, November 1996

Regarding the fact that you can take precision with you, wherever you go: "The Delta got great marks for quality of cut and portability, and for its innovative cutterhead assembly lock." "Editors' Choice"

American Woodworker™, December 1996

All of which leaves us with very little to say except this: If our planer fails to perform up to your expectations within 30 days of purchase, you can return it for a full refund. That's our Superior Performance Guarantee. And now, for a limited time, we'll even throw in an extra set of knives — a $30 value. Call toll free for the name of your nearest Delta dealer. Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

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with Norm Abram
and The American Woodshop
with Scott Phillips.
Check out old furniture—you can fix a lot yourself

Whether it's that little desk from grandma's house you so loved to draw at during rainyday visits, or an intriguing cocktail cabinet you spotted last weekend in a secondhand shop, old furniture can prove almost magical in its appeal. Sooner or later, we all feel the urge to give some old treasure a new lease on life. In this series, we'll show you ways to repair, refurbish, and refinish furniture.

You have an advantage in reviving flawed furniture

As a woodworker, you're way ahead of most people in having the knowledge and ability to tackle furniture renovation. With basic woodworking skills and common sense, you can make many repairs. And you probably already have the tools required.

Some tasks will call for professional attention—upholstering a seat or resilvering a mirror, for example. But you may find that you can perform partial repairs yourself, then farm out the jobs that require a specialist.

Give your treasure a good once-(or twice-)over

Always begin by assessing your renewal project. Sometimes, you'll find more than one problem requiring repair. But you may be surprised by how many of those repairs call for skills you've already honed in project building—cutting, fitting, aligning, gluing, sanding, finishing, and such.

Take into account what you'll be doing with the furniture. If it will be in regular use, you may have to do some preventive repairs, too.

Some questions to ask yourself as you inspect the item

- Are any parts missing? If so, is there another one like it on the piece that you can use as a pattern to make a replacement?
- Are any parts broken? If so, can the broken part be repaired, or will you have to make or find a replacement piece? If you'll have to make one, can you salvage the broken part to use as a pattern or is there another part like it on the piece to serve as a pattern?
- Can you find clues indicating where unattached parts go and how they fit? Glue marks, broken wood, screw holes, matching parts still attached elsewhere, or your knowledge of woodworking techniques can point the way.
- Is the hardware all there? If not, how easily will you be able to replace the missing items?
- What's the finish on the piece, and what condition is it in? If it's veneered, is any of the veneer lifted or missing?
- Are there things you just don't understand about how the piece goes together or what some of the parts are for? If so, consult a furniture-repair professional.
- Are repairs required that you aren't able to make? Damaged carvings, for instance, would fall into this category if you aren't a woodcarver. Again, answering yes means it's time to talk to a repair or restoration pro.

Let us know what you want to know

We'll dig up a variety of furniture faults in this series and offer tips for fixing them. We'll also point out things you shouldn't do to old furniture—improper repair or refinishing often diminishes an antique's value.

But we want to hear your ideas, too. Drop us a line to suggest topics or furniture-repair problems you'd like to see discussed. Write to The Furniture Repair Shop, WOODs magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023.

Photograph: Marty Baldwin
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Spray adhesives work wonderfully for adhering scrollsaw patterns to a workpiece. But the inevitable glue overspray can leave a real mess on your benchtop. And if you spread out newspapers, you quickly find that the patterns stick to the newspaper as well as they do to your workpiece. This handy adhesive drawer makes the job slick, not sticky.

The hardware cloth, available from most home and garden centers, allows the glue overspray to pass harmlessly through to the drawer bottom. And your patterns won’t stick to this mesh.

Build the drawer and guides as shown in the drawings. Attach the guides to the underside of your benchtop with #8 x 2" flathead wood screws.

If you have an apron beneath the top of your bench, you’ll need to lower the drawer. Add the height of the apron to the height of the drawer guides. To keep the drawer from tipping as it opens, attach an additional 3/8 x 1/8" hardwood runner to each drawer guide 2 1/4" from the bottom of the guide.

Project Design: Rick Hatchenson
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**TIPS FROM YOUR SHOP (AND OURS)**

His well-organized shop affords Top Shop Tip winner Bill Wallis more time to build beautiful projects.

Bill Wallis has no problem deciding what projects to make; his problem was finding all of those projects in his back issues of WOOD magazine. He took care of that with this issue's Top Shop Tip at right.

Bill spends a lot of his time in his workshop, crafting jewelry boxes and keepsakes for his two daughters and their families. "I've built just about every jewelry box that's been in your magazine," he said.

Your solution to a woodworking problem may be worth $40. If we select your idea as our Top Shop Tip, you'll win a tool prize valued at more than $250. Plus, we'll include your photo in this column. To submit a tip, send a letter, including your daytime phone number, with a photo or drawing of your idea, to:

**Tips from Your Shop (And Ours)**
WOOD Magazine
1716 Locust St., GA310
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We try to publish original shop tips, so please send your ideas only to WOOD magazine. And remember, we cannot return submissions. Thanks!

---

**A great way to organize WOOD® magazines**

As an avid fan of WOOD magazine, I have saved all of my back copies for ready reference. However, it can become quite a chore to locate specific articles and projects, even with the help of your annual index.

My new system has solved that problem. I wrapped colored, self-stick file folder labels around the bound edge of each magazine. Then divided my collection into groups of 10 issues per color. To keep it simple, I only use four colors of labels and then start the sequence over.

Mark issue number on label close to edge of magazine.

---

Bill Wallis receives a Bosch 3hp plunge router (model 1615) for sending us this issue's Top Shop Tip. Thanks, Bill!

---

**It takes more than two hands to handle these whoppers**

I bought a pair of jaw extenders for my pipe clamps, but found I needed three hands to keep them in place: The movable jaws kept swinging around whenever I tried to position them. So to keep them in place, I drilled and tapped a hole in the side of each sliding extender and threaded in a thumbscrew. Now I can set that extender at about the right spot, and tighten the screw to hold it in place.

— Tom West, Greenfield Center, N.Y.

Continued on page 26
Can Your Table Saw Pass The Nickel Test?

Try it. See if a nickel will stand on your saw while it’s running.*
Odds are it can’t.
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Plus, each one is built in the USA and backed by the RIDGID lifetime warranty against defects in material and workmanship.
So see for yourself what RIDGID quality is all about. It only takes a nickel.
Conquer the ruler and become the king of crown molding

When installing crown molding, I find it difficult to measure accurately between the corners of a room. A tape measure can't measure precisely enough into corners for me to cut nice, tight miter joints.

To record this tricky measurement accurately, I made a pair of molding jigs like the one shown at right. On each, I cut one end to 90° and the other to 45°, with the longer edge exactly 6" long. (I made the second jig with the angles switched to fit together in a corner as shown.) Then I attached a couple of triangular cleats, cut from 3/4" stock, to match the spring angle (the angle between the wall and the back of the molding). Because walls and ceilings seldom meet at a true right angle, I clipped the corner off the 90° angle of the cleat so it wouldn't interfere.

To measure wall length, I simply butt these two jigs together in each corner of the room and mark the walls at the end of each jig. I then measure between the marks, add 12", and cut the molding to that length. The jigs are also handy for marking reference lines every few feet along the wall to keep the molding aligned while I fasten it in place.

—Jeff Jones, Bakersfield, Calif.

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Pipe-cleaner brush gets staining detail

It's hard to get stain or paint into narrow spaces, but I solved the problem with nothing more than a wooden handle and a pipe cleaner. As shown below, I drilled two small holes in one end of the handle of an old foam brush, bent the pipe cleaner in half, and stuck one end in each hole.

I dip the pipe cleaner into my finish and work it into just about any tight spot. When I'm done, I just pull out the pipe cleaner and throw it away. I then pop in a new one, and I'm ready for my next project.

— Bill Allison, Fort Worth, Texas
Take aim at power-tool sawdust

Rather than invest in shrouds and pipe connections for both my drill press and scrollsaw, I use a stand-mounted boom that adjusts to put suction just where I need it. To build the "dust cannon," I cut the post and mounting arm as shown below. To cut the slots in the post and arm, I made several progressively deeper passes using a plunge router equipped with a 3/8" straight bit.

Next, I cut a circular lid from 3/4" plywood to fit snugly into the top of a five-gallon bucket and cut the slot for the post as shown. I slid the lid partway up the post, and attached the post to the bottom of the bucket. Then, I filled the bucket half-way with sand, slid the lid into place, and attached it with screws.

The "barrel" is made from 3" thin-walled PVC pipe. I shaped the mounting blocks to fit the curvature of the pipe, positioned the mounting blocks and arm on top of the pipe, then drilled a 3/4" hole through all three pieces. I attached the arm to the post with a carriage bolt, washer, and wing nut, then bolted the pipe and mounting blocks to the arm. With a dust-collection hose clamped to the end of the pipe, I just aim my cannon at its intended target and "fire!"

—Pete Burgoyne, Wawa, Ont.

![Diagram of dust cannon setup](image)
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**Tips from Your Shop (and Ours)**

**Enjoy a treat, then make a micro-sander**

Whether it’s leveling a few dust nibs in a finish or cleaning up a spot of dried glue, sanding into small, tight spaces can prove difficult. If you get stumped trying to sand in a spot too tight for an electric detail sander, don’t despair. Just grab a Popsicle and treat yourself to a snack.

After you’ve finished your treat, clean and dry the small wooden stick that it comes on, and secure a strip of sandpaper to it with spray adhesive. Trim the sandpaper flush with the edges of the stick, and you’ll have a great little micro-detail sander. You can also buy the sticks in bulk at most craft-supply outlets.

—John Heger, Chicago
PVC hood corrals shaper dust

Few tools in my shop churn out more chips than my shaper, making a dust-collection hood a necessity. Since my older-model shaper didn't come equipped with a hood, I designed my own.

First, I cut a short length of 4" PVC drain pipe and used a bandsaw (a hacksaw would work, too) to cut a notch as shown so it fits snugly against the fence. Using a hole saw, I cut a hole in the pipe slightly smaller than the outside diameter of my dust collector hose, then filed and sanded the hole for a snug fit. I topped off the hood with a 4" PVC test plug. Since I made the hood, my shop's never been cleaner!

—Quentin J. Morris, Apple Valley, Minn.

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Circle No. 2185
Spinning spacer extends reach of dog holes

The space between the dog holes in my workbench is longer than the opening of my vise. So, I found myself hunting for a board to bridge that gap, until I came up with the rotating stop shown below. Built from plywood and a short piece of dowel the same diameter as the dog holes, I just put the dowel in a hole and rotate it to add 1", 2", 3", or 4" to the reach of my vise. If you don’t have a quick-action vise, you can also use the spacer to save some cranking.

— Ev Roberts, Des Moines, Iowa
How did I carve these?

With Jesada’s 3D Router Carver™ System

What is the 3D Router Carver™ System?

The 3D Router Carver System is a unique patented method of producing intricate carvings quickly, economically and with complete repeatability. With the Carver Bit, Carver Templates and your 1/2" collet plunge router you can carve any flat wooden surface with designs that rival the work of a professional carver. In fact, the 3D Carver System’s speed, accuracy and economy make it attractive to the professional or the serious amateur. Besides your router, the system requires three key elements:

1) The 3D Carver Bit: A 1/2” shank, carbide-tipped V-Groove Bit is enclosed in a 45° guide bushing. A threaded shaft within the bit’s shank allows precise depth adjustment of the tip of the V-Groove Bit.

2) Template Holding Frames: The templates frame the 3D Templates securely in place.

3) Carver Templates: A total of over 50 templates produce a host of designs for cabinet doors, panel doors, drawer fronts and many other applications. Can you make your own template? You’ll find it pretty hard unless you’re a skilled patternmaker. Our templates feature intricate designs cut on computer-controlled machinery with precision that’s difficult to match in the shop.

How does the system work?

Using the 3D Carver is easy. It’s installed in the router (1/2" collet only) with the plunge mechanism unlocked so that the router can move up and down as you rout. The 45° bushing follows the slots in the template. As the slot gets wider, the router moves downward, so the v-groove gets wider. As the slot narrows, the router moves up and the groove gets narrower. That’s it!

How do I get started?

With our Starter Set!

This popular kit includes everything you need to get started with the 3D Router Carver. It includes the templates and holding frames to make the 3D Cabinet Kit and Drawer designs shown above, plus a 3D Router Carver™ Bit, complete instructions & the 3D Carver video. 499-010X 3D Carver Starter Kit Classical Door and Drawer with 3D Carver™ Bit and a video!

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Where can I learn more?

From our complete Pattern Set

Our 3D Carver Pattern Set includes full-size reproductions of all 52 designs printed on heavy paper stock that can be quickly removed from the binder.

3DC-900

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Or the 3D Carver Video!

The 3D Carver Video is the perfect introduction to this exciting tool. You’ll see the system in action as the narrator offers a complete step-by-step explanation.

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The 3D Carver System™ & Templates are protected by U.S. patent #5,146,905 & International patents.

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San Ramon, California, woodworker Jim Kull, 55, has been restoring furniture, building antique replicas, and doing custom work full-time since he took early retirement a decade ago. "It's something that I always wanted to do, but I wasn't expecting to set up shop until I was 62," Jim offers. "Today, I love restoration, and that includes wood finishing." He reflects that in his many expert contributions to the discussion group at WOOD ONLINE®, WOOD® magazine's web site (www.wood-magazine.com). So, when we wanted to get filled in on filling wood grain, we turned to Jim.

Why fill in the first place?
"If you want a glasslike finish, such as on a desk or a tabletop, you have to fill the grain—actually the wood pores in the grain," says Jim. "Oak is the best example. You can see an oak piece with either filled grain that has a smooth, reflective finish or with unfilled grain and a semi-rough look. The difference in texture is like glass versus fabric."

Yet, as with most anything, there's more to filling than smoothness, according to Jim. "Filling is more a matter of preference for the look you want or an effect that you are trying to achieve. Because in addition to finish texture, you can either accent the grain or subdue it—making it striking or bland."

There are essentially four ways to fill the pores of a coarse-grained wood like oak, walnut, and mahogany. And from Jim's experience, none of them prove easy.

"You can fill the pores with your finish material, whether it's varnish, lacquer, or water-base," he explains. "It just takes repeated coats with sanding in between. This won't accentuate the grain any more than it is naturally. Secondly, you can use a
Fill 'Er Up For Perfection

prepared water-based filler right out of the can. It takes stain, so you can highlight the pores, but it also has distinct disadvantages—like drying too quickly—that make it difficult to use. I don't bother with it.

That leaves two options: an oil slurry and commercial oil-based paste filler. Jim prefers the oil slurry, so we asked him to go through that process first.

**Filling pores with a homemade slurry**

A watery mix of insoluble materials is a slurry. To Jim, that means an oil/varnish, such as Watco Danish Oil, mixed with sanding dust. "The Watco darkens the pores for contrast," he says. "I pour a liberal amount on the surface, then sand vigorously with 100-grit—the paper has to produce sanding dust."

With burlap, a towel, or an old washcloth, Jim packs the slurry into the wood. "I don't wipe off any excess slurry," he notes. "I just let it dry overnight. Then, I sand it again, adding more oil if needed. The new sanding dust blends with the original slurry and further fills the pores when I pack it in. This time, I wipe off the excess before letting the surface dry. After the second slurrying, all the grain should be filled."

The tinted oil in the slurry will have colored the entire wood surface. To color only the pores requires removing the dried surface oil with more sanding. "If you don't want to stain the wood," Jim advises, "simply use a clear or natural oil, such as linseed oil diluted about one-third with paint thinner. Then your slurry will take on the ambient color of the wood and tend to wash out the grain for an even look [see photo below left]. In either case, I let the surface dry for several days before final sanding and the application of a finish coat."

**Putting on commercial paste filler**

"Paste filler comes from the can the consistency of peanut butter. So thin it with paint thinner, benzine, or naphtha to a heavy cream," Jim instructs. "And because a paste filler is generally off-white in color, you'll have to add stain or a tint to it if you want to accent the grain [as shown below right]. Otherwise, the light-colored filler will obscure it. You can purchase colored fillers, but for better results, color your own."

Jim applies the paste filler to the surface with a small plastic spreader (as shown previous page), pushing the creamy material across the grain into the pores of the wood. After the filler has dried, Jim sands the entire surface with 120-grit to remove the filler from the nonporous areas. The remaining filler accentuates the grain. After cleaning the surface of dust with a tack cloth, he lays down a clear finish.

According to the finishing expert, a paste filler can provide some spectacular results. "You can stain the wood dark, seal it, then put on a lighter filler for contrast. Or vice versa. Myself, I like to make the wood jump out at you." ♦

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The striking grain contrast of this oak sample came from accenting with a darkly tinted commercial paste filler.

Use an untinted, natural oil slurry to achieve an even coloration in the filled wood grain, as on this piece of oak.

Written by Peter J. Stephano  Photographs: Jim Kull by Dan Sullivan; Hetherington Photography

WOOD MAGAZINE  WINTER 1998

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Baskettmaking doesn’t involve precise joinery, but it does require concentration and a sense of order. And you easily can work the materials on a tabletop.

INSET: Joe Melcher helps his wife, Barb, gather the different spokes before starting to weave a basket.

Baskets, like furniture, often start out as trees. But instead of being made from boards, they’re crafted from thin splints of ash, oak, and white cedar, or bark, roots, and stems of trees like birch, willow, and spruce. Of course, there are other materials, too, like reed, rattan, sisal, seagrass, bamboo, and jute. But unlike furniture,
Basketmaking in 10 Easy Steps

Baskets require few tools, less precise measurement, and simple joinery. You don’t even need a workshop. A tabletop serves quite nicely. Yet, just as with woodworking, making baskets provides relaxation and the satisfaction of creating a thing of beauty and utility.

Joe Melcher, a Des Moines, Iowa, retiree, took up basketmaking by chance four years ago while he was recovering from surgery. “My wife, Barbara, and I were spending some time at the lake in our travel trailer. I wasn’t able to do much physically, and was getting bored,” Joe recalls. “Then, our friend, Terri Brain-Summers, came for the weekend. She belongs to a basketmaking club in Kansas City. Of course, she brought some material along to make baskets. I got pretty interested watching her build one up, and gave it a try. I got hooked!”

Wanting to learn more, Joe took a few lessons from a local basketmaker. Now, he not only makes baskets—all kinds of them—to give away and sell, but occasionally teaches classes himself. “It’s therapeutic, and rewarding, too,” he says. “And I can work on them right in our living room.”

We visited Joe one day to see what’s involved in basketmaking. What we got was a lesson, with Barb as his motivated student. Here, you’ll learn the basic steps to make a simple, straight-sided bread basket, just as we did.

1 Laying out the spokes After cutting five 22”-long and eleven 17”-long spokes from 1/2” flat reed, Barb marked their centers with a pencil line on the rough side. To find the rough side, soak the reed in water for a few minutes, then fold it over your finger. The rough side will have the most tiny “whiskers” sticking up and will become the inside of the basket.

2 Weaving the bottom Barb has laid the 11 17”-long spokes horizontally (to her left and right) on the table and aligned their center marks. Then, taking a 22”-long spoke, she plain-weaved it (worked it over and under) vertically (away from her) through the 11 spokes along their center line. She repeated the weaving with the four remaining long spokes, alternating on each side of the center spoke. A clothespin held the corner as she wove.

3 Preparing the twine After trueing the base to 4×10½” and squaring up the spokes so that the spaces between them were even, she prepared the round reed for twining. She had soaked the 6’ length in water for a few minutes to soften it. (Basketmakers always keep water and a towel handy.)

Next, Barb crimped the reed with a needle-nose pliers at the center of its length and folded it in half. Crimping prevents cracking when it’s folded.
4 Twining the base  Barb began the twining that holds the base in shape by laying the folded edge of the round reed around one of the spokes on the long side of the base next to the woven bottom. (See the drawings, right.) She then brought the part of the reed (now called a weaver) that was below the spoke to a position above the next spoke, keeping it tight against the weaving. Next, Barb picked up the weaver below the first spoke and wove it under the next spoke. She repeated this over-under weaving all around the base. To end the twine weave, Barb nipped off the ends of each weaver, leaving just enough material to cross a spoke and tuck into the weave.

5 Bending up the spokes  When the twining of the base was complete, it was time to bring up the basket sides. Barb soaked the woven base, twining, and spokes for several minutes in the ever-present water.

To bring up the dampened spokes for the sides, Barb bent them toward the center of the basket. To avoid cracking the spokes, she gently rolled each against a pencil on their rough side (the inside). Clothespins helped hold the spokes in approximate position until they dry. When dry, they'll retain their position.
6 Weaving the sides  Because each row of weaving consists of one long weaver, Barb cut 15 36" long weavers from ¼"-wide flat reed to do the sides, then placed them in a basin of water. (Damp reed makes the weaving easier.) For accent, she had previously soaked three of them in water mixed with red fabric dye.

Taking one of the weavers from the basin, Barb began her weaving four spokes in from the corner on a long side. (Every row of weaving from there on began on the opposite side of the basket from the previous one.) With the weaver smooth side out, she wove over-and-under around the basket, keeping the spokes as upright as possible and tight to the twining.

At the end of the first row, as with the others, she overlapped the weaver by four spokes, cut it off, then tucked it behind a spoke, as shown in the Hiding the weaver drawing below. (This burying of the weavers as she worked up the sides produces a more finished-looking basket.) Note that for rows 9-11, Barb used the dyed weavers. Clothespins again helped keep the weavers in place as she progressed with the sides.

With scissors, Barb cut off the spokes that projected up from the inside of the weaving (which is every other one) even with the last weaver. The remaining spokes received a different treatment.

8 Adding the rims  Barb dampened the remaining upright spokes—those on the outside of the basket—then one by one bent them down on the inside. With scissors, she trimmed each one just long enough to reach and tucked into the the three colored rows of weavers, as shown in the Tucking in the spokes drawing below.

To rim the basket, Barb cut two lengths of ½"-wide flat reed (same as used for the spokes) to 36". One was for the outer rim, the other for the inner. She also trimmed some #2 seagrass to the same length as the flat reed.

With the help of ever-present clothespins, Barb fitted the outer and inner rims to the basket, overlapping each a few inches before trimming. This effectively sandwiched the top two rows of weav-
ing. Atop the rims, she next laid down the seagrass through the makeshift clamps, butting the ends rather than overlapping them. The seagrass effectively dresses up the sandwich below it.

9 Lashing down the rim For the lashing that holds the rim and seagrass in place, Barb cut a length of ¼"-wide flat reed about 90' long and placed it in water to soak for three minutes. But because of the lashing's length and her relative inexperience in attaching rims, she called on Joe for assistance.

To begin, Joe showed her how to tuck 2' of reed up between the rims from inside the basket, rough side facing in. Then he taught her to bring the long end of the reed over the rim and insert it between two spokes at the base of the rim. Slowly, carefully, she pulled the long length through the spokes, then repeated the move. Patiently, Joe helped Barb complete the lashing (knot tiers call it whip lashing), pulling the reed tight as she fed it over and under the rim with equal spacing.

At Joe's quiet direction, Barb skillfully completed the lashing by taking the end of the reed and inserting it into the colored rows at exactly the place where the lashing had begun. A snip with the scissors trimmed the lashing reed so that the start/end "joint" was almost invisible.

10 Staining the basket Joe advocates instant tea to stain baskets because of its natural look. Materials either can be dipped in the hot tea solution for a few minutes before weaving or the finished basket can be soaked. "Either way, be sure the reed is absolutely dry," he cautions. "Otherwise, the wet reed won't soak up enough color, or it won't take the color evenly."

If he dyes the finished basket, Joe again pushes the weaving tighter. When it has dried, he either leaves it unfinished or sprays on a coat of semi-gloss lacquer.

Written by Peter J. Stephano
Photographs: Marty Baldwin
Drawings: Roxanne LeMoine
Bent-Laminated

Learn about forming curved parts as you build these hangers and hooks.

Hanging your good coat on a bent-up wire hanger almost guarantees it’ll end up in a heap on the closet floor. A sturdy wooden hanger will keep your coat uncrumpled. And while you make this handsome hanger (or the companion coat hook), you’ll learn all about forming strong, versatile bent laminations.
First, cut a routing template

1 Photocopy the full-size pattern for the hanger form template and/or coat hook form template. You’ll find them in the WOOD PATTERNS® insert in the middle of the magazine.

2 With spray adhesive, adhere each pattern to three-fourths-thick plywood, particleboard, or MDF. You’ll need an 8x19" piece for the hanger, a 6x6" one for the coat hook.

3 Bandsaw the form template slightly outside the line. Sand to the line with a drum or spindle sander, as shown below. (We’ll focus on the hanger as we discuss making the form and laminating the blank; follow the same procedures to make the coat hook.)

4 On a plywood template, fill any voids along the curved edge to make a smooth path for the router bit’s guide bearing.

Next, rout the two-part form

1 Laminate the form blank from two pieces of three-fourths-thick plywood, particleboard, or MDF. You’ll need two 12x22" pieces for the hanger form, two that measure 10x14" for the coat hook form. After the glue dries, sand the form blank’s edges flush and smooth.

2 Attach the form template to the form blank with brads or finishing nails, centering the straight edge of the template along one edge of the blank. (Don’t use large nails; you’ll remove the template later.)

3 Rout around the curved template edge with a half" pattern bit chucked in a handheld router (shown in Photo B, next page). Make the first pass with the bit adjusted to the shallowest possi-
Bent-Laminated Hang-ups

The pattern bit's guide bearing sits atop the cutter. When cutting the lamination form with this bit, make shallow passes.

Keep the pattern bit's guide bearing firmly in contact with the template when routing the form.

After separating the form sections, trim the sawn part of the edge with a flush-trimming bit. Guide against the routed part of the edge.

- Cut stock to size for resawing. For each hanger, you'll need eight pieces 1½" wide and 27" long. The coat hook calls for eight strips 1¼" wide and 14" long. Almost any stock will work for hangers and hooks—we used ash, cherry, mahogany, and walnut. At the same time, cut some scrapwood for test laminations.
- Draw an indexing mark, such as the lines shown in Photo E, across one end of the stock so you can restack the strips in order after resawing. This will help prevent mismatching that could result in color variations.
- Joint one face of the stock. Then, after you resaw each strip from it, joint the face again before sawing the next one. Each piece then will have one jointed face and one sawn face.

Resaw a stack of thin strips

1 Set up your tablesaw or bandsaw to resaw ½"-thick strips for the lamination. We sawed ours on a bandsaw, using the jig and following the technique described in the resawing article, beginning on page 47 in the November 1998 issue of WOOD® magazine.
2 Cut stock to size for resawing. For each hanger, you'll need eight pieces 1½" wide and 27" long. The coat hook calls for eight strips 1¼" wide and 14" long. Almost any stock will work for hangers and hooks—we used ash, cherry, mahogany, and walnut. At the same time, cut some scrapwood for test laminations.
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ble cutting depth, as shown in Photo C. Then, in successive passes, cutting deeper by ¼" each time, rout to the bit's maximum depth. (But don't rout deep enough to go all the way through the blank.)
5 Remove the template from the routed blank.
6 Bandsaw or jigsaw along the middle of the routed groove. Take care not to cut into or mar the routed edges.
7 Seal the form edges with varnish, or cover them with plastic packaging tape. Fill any voids along the edge if you made your form of plywood.
5 Before resawing the good stock, cut eight scrapwood test pieces. Stack them, and make sure the bundle measures ¼" thick. Adjust the saw setup if necessary, and retest. Then, resaw the project material.

**Glue up the lamination as you bend it to your will**

1 Position the two parts of the bending form on your bench, with waxed paper under them, and gather the necessary clamps. We employed two quick-acting clamps and four bar clamps.

2 Lay out the strips for the lamination in order, sawn faces up. Spread glue on the sawn faces, and restack the pieces in order. (We glued our lamination with yellow woodworker’s glue.)

3 Center the stack in the form, and draw the two parts together, as shown in Photo F. Pull the form together steadily and evenly, keeping the lamination centered and the edges flush.

4 Switch to bar clamps as the bending nears completion. (So you won’t lose headway, put on the bar clamps before loosening the others.) To prevent the springy lamination from spreading the form, add an additional clamp across the bottom, as shown in Photo G. Leave the clamps in place until the glue fully cures.

**Take your woodworking skills right to the edge**

1 Plane one edge of the laminated blank flat and true. (We did this with a block plane, as shown in Photo H, next page.)

2 Guiding against the planed edge, bandsaw the hanger blank to 1¼" wide, as shown in Photo I. Saw the coat hook to 1" wide.

3 Drum-sand the top and bottom faces. A 100- or 150-grit drum will smooth the faces and remove any scrape marks left by the forming.

4 Rout a ½" round-over along both top edges, as shown in Photo J. (The bottom edges remain square.)

*Continued*
Bent-Laminated Hang-ups

Form the round-overs using a 3/8" round-over bit in a table-mounted router. Start with a shallow cut, and make several passes to shape the edges. Pushblocks of the type used with a jointer serve well for this job, as shown.

5 Place the original routing template inside the lamination, and transfer the trim marks to the lamination. Also mark the centers for the holes, where shown.

6 Bandsaw the ends straight across, then round them slightly with a disc sander. Sand a 1/8" round-over on the top edge of each end to match the edges.

7 Drill and countersink holes where shown on the Hanger and Coatrack Exploded View drawings and the Coat Hook Side Section View drawing.

8 Finish-sand the hanger or hook. Use progressively finer grits from 150 to 320 for a smooth surface.

You're just about ready to hang it up on this project

1 Drill and countersink a 1/8" hole 1/4" deep into a 1 1/2"-diameter wooden ball. For the coat hook, drill 5/8" holes 1/2" deep into a 1 1/2" wooden ball and a 1" one.

Here's an easy way to drill the balls accurately. Position a piece of 3/4"-thick scrapwood beneath the chuck of your drill press, and clamp it to the table. Bore about 1/2" into the wood with a 1" Forstner bit.

Change to the appropriate twist drill, and lay the wooden ball in the hole in the scrapwood, as shown in Photo K. Grip the ball with a handscrew clamp, and drill the hole.

2 Finish-sand the wooden balls. Do it quickly and easily with your drill press this way: Cut the head off a #8 x 2" wood screw. Chuck the screw shank in your drill press, then screw the ball onto the screw point for sanding.

3 Insert the hanger hook (see the Buying Guide for our source) through the hole in the hanger. Apply epoxy glue to the threads, and screw on the 1 1/2" ball.

Plane one edge of the lamination smooth and straight after removing it from the form.

Guiding against the planed edge, bandsaw the laminated blank to width. Allow a little extra width, then plane or sand to finished width.
For the coat hook, push the screws through the holes, apply epoxy to the threads, and thread the balls on.
4 After the glue cures, apply a clear finish. We sprayed on three coats of semigloss lacquer, sanding between coats with 320-grit abrasive.

Rack up another handy item while you’re at it
1 To make a coatrack with several coat hooks, multiply the number of hooks by 6". Cut a ¾×3½” board to that length.
2 Mark positions for the hooks on the board. Place the hooks 3” from each end and 6” apart. Draw a line at each location, and mark centers on the line 1½” from the board’s top and bottom edges.
3 Drill ¾” pilot holes at the center marks.
4 Rout a ¾” cove around the board on the front face.
5 Finish-sand the board, and apply a clear finish.
6 Attach the coat hooks to the board with #8×1” flathead brass wood screws.
7 Hang the completed rack on the wall with screws into wall studs or suitable wall anchors.

Buying Guide
Hanger kit. Kit includes ten brass-plated coat-hanger hooks and ten 1½” wooden balls to make ten hangers. Order item no. 1428, $11.80 plus $3.95 shipping and handling in U.S. Minnesota residents add 77¢ tax.
Hook kit. Kit includes 20 1¾” and 20 1” wooden balls and 100 #8×1” brass-plated flathead wood screws to make 20 hooks. Order item no. 1429, $12.05 plus $3.95 shipping and handling in U.S. Minnesota residents add 78¢ tax.
Both kits from Meisel Hardware Specialties, P.O. Box 70W, Mound, MN 55364-0070. For credit card orders, call 800/441-9870. In Canada, call 612/479-2138.

Project Design: Jan Svec
Illustrations: Roxanne LeMoine; Luna Johnson
Photographs: Hetherington Photography
Furniture Carving

It adds another

Many traditional furniture styles call for carved ornamentation. But let's face it: Lots of woodworkers who can build great furniture aren't accomplished carvers. So, we asked our designer and builder, Jan Svěc—a furnitureremaker, not a carver, by the way—to come up with a way woodworkers could give their projects that final, hand-carved touch. Here's what he came up with.

We carved two strips of leaves and attached them to a hall mirror. To build the mirror, follow the instructions beginning on page 68 with this exception: Make the stiles (part D) 26" long instead of 39". And you can modify the size of the leaf pattern, or even curve it, to fit other furniture.

You'll need tools like these to carve the leaves

For power-carving the oak-leaf appliqués, we relied on a variable-speed hand-held rotary tool and an assortment of rotary carving bits, shown below. (Woodcraft

We used these bits to carve the leaf appliqués—many similar styles would work. Shown are ¼", ⅛", and ¼" ball cutters, a taper burr, a wire wheel, flame and teardrop ruby cutters, and a taper Typhoon bit.)
for Noncarvers
dimension to your projects

and other mail-order suppliers
show the bits in their catalogs.
You could accomplish the work
with other types of bits, too.

Cut out and rough out two
long, leafy pieces of oak
1 Photocopy the full-size Oak Leaf
Patterns (they're in the WOOD
PATTERNS® insert in the middle
of the magazine). Using spray
adhesive, adhere them to two
3½×2½×19" pieces of oak.
2 Scrollsaw around the outline of
both pieces. Do not cut the indi-
vidual leaves apart.
3 Carve around the top of each
overlapping leaf, as shown below.
Cut to about half the depth of the
blank, using the ball-shaped cutters
(1-3 in the bit photo). This will
form a channel across the top of
each leaf where it overlaps another.
If you're carving with a variable-
speed tool, try different speeds to
see how they affect cutting effec-
tiveness and control. We found
that our Dremel MultiPro tool per-
formed most satisfactorily on this
job with the speed set about mid-
way along the 1-5 speed scale.
4 With an aggressive taper cutter,
such as the Typhoon bit shown
below right, taper each leaf's sur-
face from the tip to the overlap.
The leaves should look something
like overlapping shingles when
you're done.

Taper the bottom leaf of each
strip from the tip to about half the
blank's thickness where the stem
meets the leaf. Carve the stem to
half the blank thickness.

Now, fashion the foliage
1 Shape the front of the leaves.
Using the ball cutters, hollow the
lobes to give the look of a curled
leaf, as shown next page, top.
Don't carve curves too deeply
into the surface—the leaves can
start to look like spoon bowls if
you go too far.
As you work, bear in mind the
cutter's direction of rotation in
relation to the wood's grain.
Often, you can reduce tearout and

Outline the overlapping leaves with a spherical cutter. Don't worry if you stray slightly from the pattern line.

An aggressive carbide cutter, such as this Typhoon taper bit, makes quick work of tapering the leaf surfaces.

Continued
surface roughness by bringing the bit to the work from a different direction. This isn’t always practical, of course.

In general, you’ll get better results, too, if you work from the center of the leaf outward as much as possible. This will help prevent damage to the edges. Vary the depth of cut to create texture and to keep the leaves from looking too uniform.

2 As you shape the leaf fronts, form a raised central vein, running from the stem to the tip. You can raise the vein with a larger ball cutter, then define it better with a 1/8" ball cutter.

3 With the small ball cutter, undercut the top of each leaf where it overlaps another. Avoid thinning the edge too much; it can chip or break. Cut back far enough to create a shadow under the leaf; this separates the leaves and adds depth to the carving.

4 After shaping the face, turn the strip over and bevel the back edges. A taper bit works well for this, as shown opposite page. But be careful not to catch the point of the bit in a corner or other tight spot; this could break chips from your carving. Round the backs of the leaf lobes, curving them up toward the edges.

Bevel back slightly past each side cut to create a shadow under the entire edge. When the strip sits on a background, the leaves shouldn’t appear to come straight out of it.

Complete the carvings, and glue them in place

1 With the leaves shaped front and back, turn to the ruby cutters (6, 7 in the bit photo) to smooth the surfaces. You don’t need to grind away all the carving marks; leave hints of them for texture. The ruby cutters themselves will leave striations on the surface, too, lending texture.
Bevel the back of the strip to make the leaves stand out from the surface. Curve the backs of the leaf lobes.

2 Go over the front and back with a small wire wheel chucked in the carving tool. This will clean up fuzzy spots and round over thin edges. Brush off remaining pieces of the pattern.

(These techniques gave our carvings a slightly rustic look, consistent with the country style of the mirror. For a more formal look, you could sand the leaves.)

3 Mark the position for the appliqués on your furniture. Spread glue on the back of the carvings, and clamp them in place. Protect the front of the carvings during clamping with scrapwood and soft pads.

Undercutting and shaping the backs of the leaves helps visually separate the carving from the underlying surface, as shown right. Shadows under the carving’s edges enhance the three-dimensional effect. When finishing furniture with onlaid carvings, such as the leaves, you can augment the effect of depth by staining the undercut areas slightly darker. Darkening the undercut areas on the face of the carving will add depth, too.

Project Design: Jan Svec
Illustrations: Roxanne LeMoine;
Lorna Johnson
Photographs: Hethersington Photography
Here's a project that's both eye-catching and easy to build—recommendations you just can't beat when you're looking for a few hours of fun in your shop.

Focus on the frame parts
1 Saw or rout ¼" rabbets ¾" deep along both edges on both faces of a ½×3½×9½" piece of bird's-eye maple for the frame sides (A). You should end up with a ¼" tongue along each edge of the stock.
2 Cut a ¼" rabbet ¾" deep on both edges of one face of a ½×3½×5¾" piece of cardinal wood. This piece will become the top and bottom (B and C).
3 Lay out the frame sides (A) on the rabbeted maple. (See the full-size illustration of the side in the WOOD PATTERNS® insert in the middle of the magazine.) Place the wide tops of the sides at opposite ends to fit both on the piece.
4 Bandsaw the slanted edge of each side (A), cutting slightly outside the line. Sand or plane to the line. Crosscut the sides to length.
5 Saw or rout a centered ¾" groove ¼" deep in both ends of the cardinal wood workpiece.
To saw the grooves safely, attach the workpiece to the middle of a ¾" carrier board about 16" long with double-faced tape. The workpiece must be flush with and perpendicular to the carrier's bottom edge. With the carrier riding against the tablesaw's rip fence, adjust the fence to center the groove on the workpiece. Saw one end of the part; then invert the workpiece on the carrier board to saw the other.
6 Rip a piece ½" wide from one rabbeted edge of the cardinal wood for the frame top (B). Rip a ¾"-wide piece from the other rabbeted edge for the bottom (C).
7 Lay out the pediment (D) on a ½×1¾×5¾" piece of cardinal wood. Bandsaw the gabled top edge slightly outside the line. Sand to the line.

An artistic way to display a photo
8 Form a \( \frac{3}{8} \)" conical hole where shown near the peak. To do so, first drill a \( \frac{3}{16} \)" hole \( \frac{3}{4} \)" deep. Then, using a countersink (the Weldon shear-cutting type works best), enlarge the hole to about \( \frac{3}{16} \)" diameter at the surface.

9 Finish-sand all parts.

**They go together in a flash**

1 Dry-fit parts A, B, and C. The front and back surfaces should fit flush. Position part C so the rabbets in the top and bottom (B and C) form a \( 5 \frac{1}{4} \times 7 \frac{3}{4} \)" rabbeted opening on the back of the frame.

2 Glue parts A, B, and C together. Position part C to establish the correct opening size. Measure the diagonals to ensure that the assembly is square. Clamp with rubber bands around the sides.

3 Glue the pediment D to the top of the frame, centering it from side to side. To assist in clamping it, reattach the wedge-shaped waste pieces to the top edges of the part with double-faced tape.

**What’s behind the picture?**

1 Cut a piece of birch plywood to the size shown for the back (E). Saw a \( 1 \times \frac{1}{4} \)" rabbet all around on the good face. Drill two screw holes where shown, and countersink them on the unribbed edge.

2 Photocopy the pattern for the leg (F). Adhere the pattern to a piece of \( \frac{3}{4} \)" bird’s-eye maple (we used rubber cement), and bandsaw or scroll saw the leg.

3 Finish-sand the leg and the back.

4 Position the leg on the back, with the top \( \frac{3}{4} \)" below the edge of the top rabbet. Then mark the hole locations by drilling through the back holes into the leg. Drill \( \frac{3}{4} \)" pilot holes \( \frac{3}{4} \)" deep in the leg. Attach the leg to the back with \( \#4 \times \frac{1}{2} \)" flathead wood screws.

5 Apply a clear finish to the frame and back assembly. (We finished ours with Watco natural oil finish, following the label instructions.)

6 Install a \( 5 \times 7 \)" piece of \( \frac{3}{8} \)"-thick glass in the back opening. Lay in the photograph, then the back.

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**Bill of Materials**

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Mater.</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A' side</td>
<td>( \frac{3}{16} )&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>B' top</td>
<td>( \frac{3}{16} )&quot;</td>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>C' bottom</td>
<td>( \frac{3}{16} )&quot;</td>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>D pediment</td>
<td>( \frac{3}{16} )&quot;</td>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>E back</td>
<td>( \frac{3}{16} )&quot;</td>
<td>BP</td>
<td>1</td>
</tr>
<tr>
<td>F' leg</td>
<td>( \frac{3}{16} )&quot;</td>
<td>M</td>
<td>1</td>
</tr>
</tbody>
</table>

* Make larger initially, then cut to finished size in accordance with how-to instructions.

**Materials Key:**

- C—cardinal wood
- M—maple
- BP—birch plywood

**Supplies:**

- \( 1 \times 5 \times 7 \)" glass
- \( \#6 \times \frac{1}{4} \)" brass screws
- \#6 finishing washers

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Project Design: © Adam Fitzgerald/Modern Artifact
Illustrations: Roxanne LeMoine; Lorna Johnson
Photograph: Hetherington Photography

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Like a lot of you, I used to wonder why I should spend $30 for a router bit when I could buy the same type of bit from another manufacturer for $15. Saw blades pose a similar dilemma. But in the course of testing various brands for WOOD magazine tool reviews, I’ve discovered that, in general, more expensive tooling results in cleaner cuts with less burning, places less strain on the machine and operator, and holds up better.

Still, I wondered what manufacturing steps produce this higher level of performance. To get some answers, I recently visited two major manufacturers based in Italy—CMT and Freud.

Why these two? Well, CMT bits came out on top in our review of router bits in the December 1994 issue. Freud products also have consistently scored high in our tests, and no company sells more high-end saw blades to you, our readers. And I was intrigued by the fact that Freud is one of the only saw-blade manufacturers in the world that makes its own carbide (more on that later).

Although many of the things I saw were similar to processes I’ve observed at plants in the U.S. and Taiwan, I noted some distinct differences that could make you a smarter shopper. Here’s what I discovered.

Bill Krier
Assistant Managing Editor

Print this article

At CMT’s plant in Pesaro, Italy, an automated lathe gives birth to a roundover bit.
Bits in the Making

Freud opens its doors and shows off its sawblade operation

It's a rare day when I get to start a factory tour in a setting as beautiful as the Grand Canal in Venice. But that's where I met Giorgio Pozzo for a 90-minute car ride to the city of Udine (pronounced Oo-dee-nch), home of Freud's six plants in the northeast corner of Italy. Giorgio is the son of founder Gianfranco Pozzo and one of three brothers involved with their father in the company.

Freud employs about 250 people in the Udine area and about 40 in its U.S. office and warehouse in High Point, North Carolina. Although Freud supplies mostly made-to-order saw blades, shaper cutters, and other industrial products for the European market, in the U.S. it sells mostly stock router bits and saw blades.

Thousands of saw blade blanks sit ready at a Freud plant, awaiting carbide teeth.

It all begins with big rolls of steel

Saw blades get their start as huge rolls of steel sheet that weigh about 3,300 pounds each. First stop for the steel: a laser capable of cutting out a saw blade, including arbor hole and expansion slots, in less than 30 seconds.

Those blanks have internal stresses in the steel that must be relieved through heat treating. Otherwise, the blade will distort during the manufacturing process and when you use it (yikes!). To relieve those stresses, the blanks go into an oven heated to 970°F. Like Freud's other automated machines, this unit runs 24 hours a day, seven days a week.

Next, a grinder makes the two sides of the blank parallel, just before another machine rolls the blank in two directions to flatten it. Then, an automated machine presses a tensioning ring into the blank as it spins under a hard metal wheel that presses into it. This ring, shown in the photo of a finished blade below, puts controlled stresses into the blade that prevent it from wobbling as it runs on a saw.

A machine automatically tensions each blade by pressing a ring into both sides.

This important tensioning process used to be done by workers in dark rooms who hammered the blades with hand mallets. Some manufacturers still do it this way, but Giorgio feels that his machines perform the process with greater consistency and at lower cost to the consumer.

After tensioning, workers stack the blades in a machine that precision-grinds their bores, as shown on the next page, top. This step makes the bore just big enough to fit onto your saw's arbor without slop. Finally, the notched surfaces that will accept carbide teeth are ground flat, smooth, and at the correct angle.

As the blanks go through the assembly process, machines check each one for runout (flatness), thickness, tension, and balance. Those that don't meet tolerances go back for correction.

Continued
Now it's time to fill in the blanks with carbide teeth
Although a good many saw-blade makers still braze each tooth in place by hand, Freud has automated this process. A machine sets a carbide tooth, flux, and a strip of solder tape into each tooth notch and then applies induction heat to melt the solder.

After the rim of the blade receives a sandblasting to remove scorch marks and excess solder, another machine checks the work of the brazing machine. As shown below left, the blade spins in front of electric eyes that perform 13 checks on each tooth. Improperly brazed teeth are removed and reattached by hand.

Next, the blades move to another Freud facility where some receive a bright red coat of nonstick PTFE (a Teflon-like substance). Then, multiaxis grinding machines sharpen the teeth with diamond grinding wheels as shown below right. These machines grind the sides, faces, and tops of the teeth to geometries that suit the intended purpose of the blade.

All that remains are polishing, screen-printing, clear-coating (of non-PTFE blades), and packaging steps. The final stop after a trip across the ocean: your workshop.

A long rod precision-grinds the arbors of a stack of blades to an exact diameter.

Electric eyes make 13 checks on the alignment and brazing integrity of each tooth in just a second or two.

Dual diamond wheels side-grind the carbide teeth. Other wheels grind the teeth faces and tops.
How to make carbide—one of the hardest materials on earth

It’s not surprising that few sawblade makers produce their own carbide. Doing so involves lots of expensive machinery, expertise, and raw materials costing $40 per pound. An on-site lab, equipped with a $750,000 scanning electron microscope that takes pictures like the one at left, is necessary to check the materials and processes.

Giorgio feels the rewards justify these hefty investments. “I can control the quality and grade of the carbide. I can fine-tune the carbide to suit the task of each cutting tool,” he told me.

The carbide starts as three powders: tungsten, titanium (for resistance to corrosion and wear), and cobalt (the glue that holds these elements together). These powders are tumbled for 12 to 36 hours for a consistent mix. After thorough drying, the mixed powder is pressed into the desired shape—say that of a saw-blade tooth—with punches like the ones shown below.

These pressed teeth crumble easily in your fingers, however, so Freud workers harden them through a process called sintering. To do this, they place the tips on graphite trays and load the trays in an oven as shown below left.

Steady nerves come in handy because each tray, with tips, is worth about $1,000. The ovens heat the pressed powder in a 2,700°F vacuum to form its components into the alloy we refer to as carbide.

The payoff of this entire process comes when you pass a piece of wood through a carbide-tipped tool. Its cutting edge should stay sharp 10 to 20 times longer than a steel edge.

Continued
Blades and Bits in the Making

Ovaldo Tommassini worked for a motorcycle manufacturer, Benelli, when he struck out on his own to form Costruzioni Meccaniche Tommassini in 1962. Ovaldo's plan: Make quality tooling for the fledgling furniture industry near his home in Pesaro (about 150 miles south of Venice). Today, his sons Stephano and Marcello (who served as my guide) help him run the business.

CMT manufactures on a much smaller scale than Freud—its second plant had opened just before my visit. "We want to increase our production," Marcello explained, "but maintain our high quality at the same time. That's our challenge now and in the future."

The birth of a router bit

CMT bits begin as bars of hot-drawn steel about 10' long. "We chose our supplier (Von Moos Stahl of Lucerne, Switzerland) carefully because it is important that the steel be just as strong on the inside of the bar as it is on the outside," Marcello told me.

These bars are loaded into a unit that cuts them to length and feeds the small steel cylinders (see Step 1) into a lathe. The lathe removes much of the steel as it whittles the shank and profile of the bit as shown on the first page of this article. This machine also taps the end of the bit if it will receive a pilot bearing. (See Step 2.) "At this stage, and all along the way, we take considerable pains to ensure perfect concentricity in our bits," Marcello said. "Concentricity guarantees a well-balanced, vibration-free bit for the customer."

Next, a milling machine cuts two slots as shown above. These slots provide a surface for the carbide tips that will be brazed to them later. What started as a 21-ounce chunk of steel now weighs a little more than 2 ounces. (See Step 3.)

To attach the carbide tips, CMT workers braze them on using one of two heat sources: electrical induction (shown on the next page, top left) or open flame. Both methods heat a bit to between 1,200° and 1,300°F. (See Step 4.)

This intense heat creates stresses in the bit because carbide and steel expand and contract at different rates in reaction to temperature changes. To preserve the integrity of the bit, it must be cooled slowly. CMT workers do this by loading bits into metal baskets as shown on the next page, top right. The baskets are then shuttled through a series of ever-cooler ovens. This process requires considerably more equipment and manpower than the cooling procedure I've observed in other plants: placing the hot bits in a container of insulating vermiculite. Is it more effective? The folks at CMT think so.

Another detail-oriented step I've seen only at the CMT plant occurs after the bits cool and are sandblasted. A CMT worker checks the integrity of every braze joint by lightly grinding along the joint. "This takes time," Marcello explained, "but you can't tell if the braze has a void or other defect without grinding its surface."
It's time for a shiny new orange coat

To receive their trademark orange color, the bits are trucked to a contractor that specializes in PTFE coatings. There the bits take a bath in an ultra-sonic cleaner that removes surface impurities. Then, the PTFE is sprayed and baked on. (See Step 5.)

Upon their return to the CMT plant, the shank of each bit is ground smooth and to the correct diameter. (See Step 6.) A machine operator chucks each bit between centers, and then a grinding wheel lightly touches the rapidly spinning bit. The operator then checks the diameter of the ground bit shanks (see photo at right).

Next comes the all-important process where the faces and edges of the carbide tips are ground to create a razor-sharp cutting edge. (See Step 7.) After grinding a seat for the bearing, workers laser-etch the shank with a model number and a code that tells the factory when the bit was made. With a bearing added, the bit is ready for duty. (See Step 8.)

Photographs: Bill Krier, Doug Hetherington; others courtesy of CMT and Freud

A micrometer helps this worker accurately check the diameter of ground shanks.
Country-Fresh Dresser
Finding all the plans you need for a complete set of bedroom furniture can try the patience of any craftsman. And finding a set as attractive as the five pieces we're presenting—well, that's really an accomplishment. Here we introduce another outstanding addition to our Country-Fresh Series. We begin with the sturdy dresser shown here, and follow up with the accompanying mirror on page 68.
Let's build the plywood carcase to start things off

1. From $\frac{3}{4}$" plywood (we used oak plywood, but walnut or cherry would be equally attractive), cut the sides and center divider (A), shelves (B), top and bottom (C), and dividers (D) to the sizes listed in the Bill of Materials and laid out on the Cutting Diagram.

2. Cut or rout all the rabbets and dadoes in the sides and center divider (A), top shelves (B), and top and bottom (C) where dimensioned on the Parts View drawings on the WOOD PATTERNS insert in the middle of the magazine. (We cut the dadoes on our tablesaw, using the fence to ensure that the dadoes in the sides and center divider align with each other and that the dadoes in the carcase top and bottom and the top shelves align. Cut dadoes in scrap stock first to ensure the depth of the dado is the same as the thickness of the plywood. Use shims if necessary to obtain the correct dado width.)

3. Using the Carcase Top drawing on the pattern insert and the detail accompanying the Carcase drawing for reference, drill the counterbores and form the slots in the carcase top (C). The slots allow the screws that secure the top (O) to the carcase top (C) to move as the solid-stock top expands and contracts.

4. Using the Top Section View and Carcase Top drawings for reference, drill holes on the bottom of the carcase top to attach the stops (AA). Countersink each hole slightly for ease in locating and attaching the stops later.

5. Dry-clamp the carcase (A-D) together, checking for square. Drill and countersink the mounting holes centered over the rabbets and dadoes where shown on the Carcase Side (A) and Carcase Top (C) drawings on the pattern insert. The front and back trim pieces (E, F) will cover the screw holes in the sides later.

6. Glue the carcase together; add the carcase top last as shown in Photo A. Check for square and that the edges are flush. Drive the screws to further reinforce the assembly. Wipe off any excess glue with a damp cloth.

Continued on page 66
### Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Matl.</th>
<th>Qty.</th>
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<tbody>
<tr>
<td></td>
<td>T</td>
<td>W</td>
<td>L</td>
</tr>
<tr>
<td><strong>CARCASE AND TRIM</strong></td>
<td></td>
<td></td>
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</tr>
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<td>B shelves</td>
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<td>28 1/2&quot;</td>
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<td>C top &amp; bottom</td>
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<td>1 1/4&quot;</td>
<td>58 1/4&quot;</td>
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<tr>
<td>D dividers</td>
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<td>5&quot;</td>
<td>16 1/4&quot;</td>
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<tr>
<td>E front trim</td>
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<td>1 1/4&quot;</td>
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<td>F back trim</td>
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<tr>
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<td>12 1/2&quot;</td>
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<td>3 1/4&quot;</td>
<td>59 1/4&quot;</td>
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<tr>
<td>M sides</td>
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<td>3 1/4&quot;</td>
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<td>5&quot;</td>
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<tr>
<td><strong>BACK</strong></td>
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<td>10 1/4&quot;</td>
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<td>W backs</td>
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<td>X backs</td>
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<tr>
<td>AA stops</td>
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<td>BB back</td>
<td>3/4&quot;</td>
<td>27&quot;</td>
<td>58 1/4&quot;</td>
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</tbody>
</table>

*Cut parts marked with an * oversize. Trim to finished size according to the how-to instructions.*

**Materials Key:**
- CP—oak plywood; LO—laminated oak; EO—edge-jointed oak; C—choice of oak, aspen, soft maple, or poplar; P—plywood.

**Supplies:**
- #8x1", #8x1 1/4", and #8x1 1/2" flathead wood screws; 9x10x1 1/4" panhead screws with flat washers; 4x4" T-nuts; 3x18x3" hanger bolts (not necessary if you buy the preturned feet); stain, clear finish.

**Buying Guide**

**Hardware.**
- For the country version, we used twelve 2" oak mushroom knobs, #61710. For the traditional version (stained with no paint), we used twelve 3 1/2" brass bail pulls, #35402. Self-adhesive and self-lubricating nylon tape. 10 ml thick by 1/2" wide by 10 long (4 rolls needed), #70615. Rockefeller Woodworking and Hardware, 436 Willow Drive, Medina, MN 55340. To order, call 800/279-4441.

**Turned feet.**
- Country version, four 3 1/2" diameter by 5"-long oak bun feet, catalog #A0557HB5. For the traditional version, use four 5" diameter by 3'-long oak beaded bun feet, catalog #A0551HB. For current prices write Adams Wood Products, 574 Forest Drive, Morristown, TN 37814. Or call 423/587-2942 to place an order.

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**Cutting Diagram**

- 3/4 x 48 x 96" Oak plywood
- 3/4 x 48 x 96" Oak plywood
- 1/4 x 48 x 60" Plywood
- 1/8 x 7 1/4 x 60" Oak
- 1 1/16 x 7 1/4 x 96" Oak
- 1 1/16 x 7 1/4 x 96" Oak (2 needed)
- 1 1/16 x 5 1/2 x 96" Oak
- 3/4 x 9 1/4 x 60" Oak
- 3/4 x 11 1/4 x 96" Oak
- 3/4 x 11 1/4 x 96" Oak or Aspen
- 1/2 x 11 1/4 x 96" Oak or Aspen
- 1/2 x 9 1/4 x 96" Oak or Aspen
- 1/2 x 11 1/4 x 96" Oak or Aspen
- 1/2 x 11 1/4 x 96" Oak or Aspen
Dresser and Mirror

Apply the trim pieces for a finished look
1 Cut the side trim pieces (E, F) to size from $\frac{3}{6}"$ stock. Cut the top and bottom trim pieces (G) to size from $\frac{4}{3}"$ stock.
2 Rout $\frac{3}{8}"$ round-overs along the edges of the solid-stock trim pieces (E, F, G) where shown on the Carcase drawing.
3 Keeping the flat faces of the front trim pieces (E) flush with the front of the carcase, glue and clamp the trim pieces in place. Add the top and bottom trim pieces (G) next, followed by the back trim pieces (F).
4 To cap the fronts of the carcase, cut the front trim pieces (H, I) to size. Before cutting the pieces, measure the width of the carcase sides plus the side trim (ours measured 1\frac{1}{4}"), and cut the trim pieces (H) to match. See the Top Section View on the pattern insert for reference. Now, cut the center trim piece (J) to the same width as the thickness of your plywood.
5 Rout the $\frac{3}{4}"$ and $\frac{1}{2}"$ round-overs on parts H and I where shown on the Carcase drawing.
6 With the edges flush, glue and clamp the pieces (H, I) in place.
7 Measure the distance between trim pieces H and I, and cut the horizontal trim pieces (J) to fit.
8 Using the Exploded View drawing for reference, rout the $\frac{1}{2}"$ round-overs on parts J where indicated. Note that there's no round-over along the top edge of the top J pieces and no round-over along the bottom edge of the bottom J pieces. Glue and clamp the front trim pieces (J) in place.
9 Measure the opening, and cut the short trim pieces (K) to size. Rout $\frac{5}{8}"$ round-overs along the edges (not the ends) of both K pieces. Glue and clamp the pieces in place.

Make a sturdy base for the dresser carcase
1 Cut the base front (L) and sides (M) to the sizes listed in the Bill of Materials from 1\frac{3}{8}"-thick stock.
2 To join the base sides (M) to the front (L), use a double biscuit or spline joint. Glue and clamp the base sides to the front, keeping the outside edges and surfaces flush. Check for square. See the Base drawing on the pattern insert for reference.
3 Mark and cut a $\frac{3}{4}"$ radius on the front corners of the base front (L).
4 Rout a partial round-over on the top and bottom outside edges of the base (L, M) where shown on the Exploded View drawing and the Partial Round-Over detail.
5 Drill the mounting holes in the base pieces where shown on the Base drawing.
6 For the feet (N), you can turn your own using the pattern on the pattern insert or order precut feet from the source listed in the Buying Guide. If you turn your own, laminate stock to form feet that measure 4\frac{1}{4}" square (3\frac{1}{2}" after turning). Then refer to the full-size pattern on the insert to turn them. Drill a center hole and add the hanger bolt (the preturned feet come with a hanger bolt installed).
7 Use a hacksaw to trim the protruding end of each foot hanger bolt so only 1" protrudes. The top of the bolt shouldn’t protrude above the top surface of the base (L, M) when inserted.

Now attach the edge-joined top to the carcase
1 From 1\frac{1}{2}" stock (commonly called five-quarter stock), rip enough narrower pieces to form the top (O). Your initial laminating should be 1" longer than needed and $\frac{1}{2}" wider.
2 Edge-glue the boards together to form the top blank. Keep the pieces as flush as possible to each other to minimize sanding of the surfaces later. Next, trim the top to the finished size listed in the Bill of Materials.
3 Mark and cut a $1\frac{1}{2}"$ radius on the front corners of the top. Cut and sand the corners to shape. Rout the partial round-overs along the front and sides of the top. See the Partial Round-Over detail accompanying the Exploded View drawing for reference.
After selecting straight-grained stock and matching it from board to board, we edge-joined the pieces into two panels. From these, we cut the drawer fronts.

Build the eight drawers to complete the construction

Note: Measure the drawer openings before constructing the drawers. The drawers need to be \( \frac{1}{8} \)" less in height and width than the openings. The fronts of the drawers should sit \( \frac{1}{8} \)" back from the front edges of the horizontal front trim pieces (J). Cut several extra pieces of \( \frac{1}{8} \)" stock to test-cut your joints before cutting the actual drawer stock.

1 Cut the drawer fronts (P, Q, R) to size from \( \frac{3}{4} \)"-thick straight-grained oak. (As shown in Photo B, we carefully matched and edge-joined stock to form two large panels. Then we cut the drawer fronts from the panels in the configuration shown. Not only did the grain flow across the drawers from left to right, but the transition of the grain pattern between the drawer fronts, top to bottom, was minimal.)

2 From \( \frac{1}{8} \)" stock, rip and crosscut the sides (S, T, U) and backs (V, W, X) to the sizes listed in the Bill of Materials.

3 Study the Drawer detail, then follow Steps 1 and 2 of the four-step drawing at right to machine the ends of the drawer fronts.

**Continued on page 82**
Enhance the beautiful dresser on the previous pages with this full-size mirror. Stout half-lap joinery and a gracefully curved top make this a must-build bedroom accessory. Or shorten the stiles and build a hall mirror as shown on page 50.

Start with the sturdy half-lap frame
1 Cut the top (A) to 4\times 38" from 1\frac{1}{4}" (five-quarter) stock.
2 Cut the bottom (B), shelf (C), stiles (D), and top trim (E) to the sizes listed in the Bill of Materials. Mark and cut a 1\frac{1}{2}" radius on the front corners of the shelf (C).

3 Fit your tablesaw with a dado blade, and cut 2"-wide dados 3\frac{1}{8}" deep in the top (A) and bottom (B) where located on the Lap Joint and Parts View drawings.
4 Lay out and cut the 3\frac{1}{8}"-deep half-lap joints on the ends of the stiles (D). Then raise the blade and cut a shoulder along the outside edge of each stile as shown in
Reflect your craftsmanship and good taste

**Photo A.** The ends of the stiles should fit snugly into the dadoes in the top and bottom pieces.

**5** Cut a ¼"-deep groove in the front edge of the bottom (B) to house the shelf (C).

**Let's shape the arched top and bottom**

1 To mark the arch along the top of the top (A), mark five points on part A where dimensioned on the Parts View drawing. As shown in **Photo B,** bend and clamp the top trim (E) to the top (A), aligning the inside edge of E with the five marks. Trace along the inside edge of the trim to mark a smooth curve along the length of part A.

2 Bandsaw to the line marked in the previous step. Sand the cut edge smooth.

3 Mark and miter-cut the angles on the ends of the bottom (B) where dimensioned on the Parts View drawing.

*Continued*
**Dresser Mirror**

**Turn to the router to rout the round-overs**

1. Rout a ¼" round-over along the front edges of parts A, B, and D where shown on the Exploded View drawing. Note that the stiles (D) have a ¼" round-over on the inside edges and a ½" round-over along the outside edges.
2. Switch to a ½" round-over bit as shown in the Partial Round-Over detail accompanying the Exploded View drawing. Rout a partial round-over along the front and ends of the shelf (C).
3. Lower the ½" round-over bit, and rout a partial round-over along the front bottom edge of the top trim (E) where shown on the Router detail accompanying the Exploded View drawing.
4. Reset the bit depth again, and rout a full ½" round-over along the outside edges of the stiles (D).

**Assemble the pieces, and install the mirror**

1. Finish-sand all pieces.
2. Glue and clamp the stiles (D) to the top (A) and the bottom (B),

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**Bill of Materials**

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Matl.</th>
<th>Qty.</th>
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<td>A top</td>
<td>1¼&quot; x 3½&quot; x 38&quot;</td>
<td>O</td>
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</tr>
<tr>
<td>B bottom</td>
<td>1¼&quot; x 4&quot; x 37½&quot;</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>C shelf</td>
<td>1¼&quot; x 2¾&quot; x 36¼&quot;</td>
<td>O</td>
<td>1</td>
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<tr>
<td>D stiles</td>
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<td>¼&quot; x 32¼&quot; x 32¼&quot;</td>
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</tr>
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</table>

*Plane or resaw to thickness listed in the Bill of Materials.

*Cut the part marked with an * oversize in width. Then, trim to finished size according to the how-to instructions.

**Materials Key:** C-oak, P-plywood

**Supplies:** #6 x 3/4" flathead wood screws, 2-3½" picture hangers, heavy-duty mirror cord, 2-50 lb. hangers, 1/4" mirror, 4 turn buttons, clear finish.
checking for square. Later, trim the protruding top ends of the stiles flush with the top curved edge of the top (A). Sand the areas to remove any saw marks.

3 Glue and clamp the shelf (C) into the groove in the bottom (B), centered from end to end.

4 Glue and clamp the top trim (E) centered to the top edge of the top (A); you'll need to bend part E in place. Keep the overhang on the ends equal. The back edge of E is flush with the back of A.

5 Rout a 3/8” rabbet 3/16” deep along the back side of the mirror frame. Then chisel the round routed corners square.

6 Cut the plywood back (F) to fit into the opening. Have a 1/4” mirror cut 3/8” smaller in length and width than the opening. (For an added touch, we had a 1” bevel machined on the edges of our mirror.) The mirror must be cut slightly undersize to allow the frame to expand and contract without cracking the mirror.

7 Finish-sand the mirror frame, and finish it as desired.

8 Position the mirror frame face-down on a flat surface covered with a blanket. Fit the mirror and plywood back (F) in place. Drill pilot holes into the back side of the stiles (D), and screw four turn buttons in place.

9 Drill the pilot holes, and attach the hangers and heavy-duty mirror cord to the mirror frame. See the Hanging the Mirror drawing above for reference.
That old oaken Scrollsawn leaves and acorns

You'll have a great time scrollsawing the fretwork face on this attractive but easy-to-make clock. You can build the clock to hang on the wall or to stand on a table or shelf.

Note: To build the clock, you'll need two pieces of oak, one that measures 1/2 x 8 x 8" (part A) and another that's 1/2 x 8 x 8" (part B).

Cut out the fancy face first
1. Spray the front face of the thin piece, part A, with clear lacquer. (We sprayed ours with an aerosol can of Deft Wood Finish.) This will help when you remove the pattern later.
2. Photocopy the full-size pattern for the clock face in the WOOD PATTERNS insert in the middle of the magazine. With a sharp knife and a straightedge, cut away the square pattern in the center. Save it for later use.
3. Adhere the fretwork pattern to the lacquered face of part A with spray adhesive. Follow the instructions on the adhesive can for temporary bonding.
4. Drill a 1/8" blade start hole inside each shaded pattern area and in the square in the middle. Scrollsaw the pattern. (We used a #4 blade, .035 x .015" with 16 teeth per inch.)

When scrollsawing, start with the smallest cutouts along one side and work up to the largest. After completing one side, move to the next section. Cut out the square opening in the middle last.
5. Leaving the pattern in place, spray on another coat of lacquer.

Spray from all angles to coat the scrollsawn edges inside the design. This will help keep paint from wicking into the wood later.

Now, laminate and paint
1. Laminate parts A and B. When you do this, apply the glue sparingly to the back of part A—you want to prevent squeeze-out into the scrollsawed area. Clamp the parts, edges flush, using a 3/4 x 8 x 8" piece of scrapwood as a clamp pad on part A. After the glue dries, sand the edges flush.
2. Spray on another coat of lacquer, taking care to achieve good coverage on the surface of part B within the square opening. When the lacquer dries, adhere the square part of the clock face pattern to part B.
3. Drill the 3/8" holes for the movement shaft and time markers where indicated. On the back, drill two 3/8" holes where shown. Center a 3/4" counterbore 1/4" deep around the center hole for the movement shaft. (We bored it with a Forstner bit.)
4. Remove the square pattern in the middle of the face, but leave the fretwork pattern in place. Mask the outside edges with tape.
5. Spray on the color coat. (We applied Krylon hunter green enamel.) Spray on several light coats, shooting from various angles to cover the scrollsawn inside edges.
6 After the paint dries, peel off the masking tape and the fretwork pattern, as shown below. Clean adhesive residue from the face, using a rag dampened with lacquer thinner.

**Routing completes the job**
1. Rout a 3/8" cove around the outer edge of the face where shown. Chuck a 3/8" cove bit in a table-mounted router to do this.
2. Press oak buttons (mushroom plugs) into the holes at the 12, 3, 6, and 9 o'clock positions. Put oak roundhead plugs at the other time marks. (Glue the buttons and plugs into the holes, if necessary.)
3. Finish-sand the fretwork face and the cove. Spray on a coat of lacquer overall, taking care to cover the routed edge. Mask the face to the edge of the cove.
4. Paint the cove and edge. After the paint dries, remove the masking from the face.
5. Install 1 3/4" lengths of 3/8" dowel rod into the holes on the back to make legs for the tabletop version. Leave them out to make a wall-hung clock.
6. Spray one more coat of lacquer overall, front and back. When dry, install the clock movement and hands. For the wall clock, install the hanging bracket as you put the clock movement in place.

**Buying Guide**
**Clock movement.** Quartz movement (order no. 200620) with gold hands (order no. 200703), $6.95 p.p.d. in U.S. Schlabaugh and Sons Woodworking, 720 14th St., Kalona, IA 52247. Call 800/346-9663.

The pattern masks the fretwork for painting after scrollsawing. The pattern is easier to remove after painting if you lacquer the wood surface first.
At-a-Glance Guide

Confused by clear finishes? How do you choose the best one for a project? Use this chart to match the properties of the available types of clear finishes to the way you want.

<table>
<thead>
<tr>
<th>ATTRIBUTES</th>
<th>OIL</th>
<th>SHELLAC</th>
<th>LACQUER</th>
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<tr>
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<tr>
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<td></td>
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<tr>
<td>See finish definitions</td>
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<tr>
<td><strong>How easily it applies</strong></td>
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**Finish definitions**
- Oil—Pure linseed and tung, polymerized tung and linseed oils, thinned varnish, varnish and oil.
- Alkyd varnish—An economical mixture of resin made from alcohol and acid, oil, and solvent.
- Phenolic varnish—An early synthetic plastic resin mixed with oil and solvent.
- Polyurethane varnish—A synthetic plastic resin usually mixed with alkyd, oil, and solvent.
- Water base—Particles of acrylic or polyurethane suspended in water.
to Clear Finishes

Your project to look and wear over time. You'll also find out how to best apply each finish and how friendly it is to you and the environment.

<table>
<thead>
<tr>
<th>VARNISH (ALKYD)</th>
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<th>VARNISH (POLY)</th>
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What thins what

- Denatured alcohol
- Shellac
- Lacquer thinner
- Lacquer, catalized lacquer
- Mineral spirits, naphtha, turpentine
- Wax, oil, varnish
- Water

Developed with Bob Flexner, author of Understanding Wood Finishing
Step right up

Make a sturdy stool that's both handy and handsome

You'll always have a step stool handy if you build either (or both) of these. The tall one features a storage shelf underneath. Box joints and angled sides make them look so good that you won't have to hide either away between uses. And, our jig for cutting the angled box joint makes both simple to build.
**Take the first step: Build the angled box-joint jig**

1. Referring to the Box Joint Cutting Jig drawing, saw the parts for the jig to size. Assemble them as shown, except for the runners and guide block.
2. Install a 1/2" dado blade on your tablesaw, and adjust the cutting depth to 1/2".
3. To install the guide block, first mark a point on your saw table midway between the miter-gauge slots. Then, mark the midpoint of the jig's width on the face near the bottom edge. Place the jig on the saw table, the face toward the back of the saw. Offset the center mark on the jig 1" to the left of the center mark on the table.

Slide the saw's fence up against the right side of the jig. Holding the jig firmly against the fence, saw a dado 3" into the base. Install the guide block in the dado, extending 3/4" beyond the face.
4. Next, install the runners. To do this, slide the tablesaw fence exactly 1" to the right. Then, put a strip of double-faced cloth tape on top of each runner. Place the runners in the miter-gauge slots, taped side up, with a 3/16"-thick shim strip under each one. (Shimming brings the runner tops flush with the table's surface.)

Holding the jig against the fence to keep it square, press the base down to stick the runners to it. Lift the jig without disturbing the runners' positions on the base, and attach the runners with screws where shown.
5. Raise the blade to 3/4" cutting depth. Cut test joints in 3/4"-thick scrapwood to verify finger spacing. Cut at least eight fingers for a good test. When cutting with the jig, clamp the workpiece to the face. To keep the jig from tipping, which would cut an inaccurate joint, press down on the back of the jig as you push it forward.

If the joint doesn't fit together properly, adjust the jig position on the runners by tapping the jig with a hammer. To increase the distance between the fingers, tap the jig to the right; to reduce it, tap it to the left.
Step right up

Make the box-jointed stool sides and top

1. Glue up stock, and cut the sides (A) to the dimensions shown in the Bill of Materials. (To make the short stool, cut the sides to the optional size shown.) Bevel the ends to 10° as you cut the pieces to length. (Saw the bevels parallel.)

2. Cut the top (B) to the length shown, but make it 10" wide to start. (You'll cut it to finished width after sawing the box joints.) Bevel both ends to 10°. (On this part, saw converging bevels. The long side will be the part's bottom.)

3. Lay out the box joints on parts A and B, shown on the Parts View drawing. Start from the center on each piece. Locate a finger at the center of each side (A) and a space at the center of each end on the top (B). (We applied masking tape to the face of each piece in the joint area, and drew our layout marks on the tape.) Lay out the cutlines for the tapered sides now, to ensure that the joints will be centered.

4. Cut the box joints in the sides (A), using the jig and a 1/2" dado blade set to a 3/4" cutting depth as shown top left. To start, remove the guide block from the jig. Align the layout marks for the first space on the right with the dado blade. Clamp the workpiece to the jig, then saw the space. Replace the guide block in the jig. Place the dado you just sawed over the guide pin, clamp the part to the jig face, and make the cut. Saw all the fingers on both sides (A) this way.

5. Cut the mating fingers on both ends of the top (B). Again, remove the guide block to make the first cut on each end, and replace it for subsequent ones. Because of the wider fingers at the outside of the joint, the first and last cut on both ends of the top (B) will be wider than the dado blade. Make these cuts in two passes.
6 Saw the tapered edges on the sides (A). (Save the waste pieces to cut screw-hole plugs from later.) Drill and counterbore the screw holes where shown, and bandsaw the arch that forms the feet. Sand both pieces smooth.

7 Dry-assemble parts A and B. Mark the width and bevel on part B, and bevel-rip it to width.

8 Lay out the oval handle opening in the top (B). Bore two 1 1/2" holes to form the handle ends, and cut between them with a scrollsaw or jigsaw. Rout a 1/4" round-over around the top and bottom of the handle opening.

Put together a handy shelf to go underneath

1 Cut parts C, D, and E to size, and bevel the ends. Bandsaw the centered handle notch in part C.

2 Dry-assemble parts A, B, and C to check the fit of C. If the part seems too short, plane or saw a little off the top (notched) edge. If it is too long, trim equal amounts from each end.

3 Form a 3/8" rabbet 1/4" deep along the bottom inside edge of each part D. Clamp the spreaders (D) and shelf (E) together, then drill and countersink screw holes from the bottom. Glue and screw the assembly together.

4 Disassemble parts A, B, and C. Apply yellow glue to the box joints, assemble them, and clamp. (Clamps with rubber or soft plastic pads grip better on the angled sides.) After pulling the joints up snugly, remove the clamps. Install part C, drill pilot holes into the ends, and drive in the screws, as shown opposite page.

5 Install the shelf assembly (D/E). Drill pilot holes into the shelf, and drive in the screws.

6 Using a plug cutter, cut 12 screw-hole plugs from the part A waste. Glue the plugs into the counterbores, aligning the grain to make them as inconspicuous as possible. After the glue dries, trim the plugs flush. Sand the joints flush, and finish-sand the stool.

Continued
Step right up

EXPLODED VIEW

1/8" counterbore 1/4" deep
with a 9/32" shank hole centered inside

#8 x 2" F.H.
wood screw

1/2" plug
5/16" long

3/4" oak plywood

Put on a long-lasting finish
1 Wipe off the sanding dust, and
spray or brush on a coat of satin
polyurethane varnish. Apply a
thin coat to prevent runs.
2 Allow the varnish to dry, then
sand the stool with 320-grit sand-
paper. Dust the surface, and apply
another light coat of finish.

3 The end grain on the box-joint
fingers absorbs the finish, making
the finger ends look duller than
the rest of the stool. To avoid this,
brush extra finish onto the end
gain to build up the coating.
4 Sand the stool once more with
320-grit sandpaper. Then, put on
the final coat of finish.

Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size T</th>
<th>W</th>
<th>L</th>
<th>Matl. Qty</th>
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<td>8&quot;</td>
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<td>9 1/4&quot;</td>
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<td>8 1/4&quot;</td>
<td>17 1/4&quot;</td>
<td>OP</td>
</tr>
</tbody>
</table>

*Make wider initially, and trim to finished size in accordance with how-to instructions.

Materials Key: O-oak; OP-oak plywood

Supplies: woodworker's glue; #8x1" and 2" flat-head wood screws; clear finish.

CUTTING DIAGRAM

3/4 x 5 1/2 x 96" Oak

3/4 x 11 1/4 x 60" Oak

1/4 x 24 x 24" Oak plywood

Project Design: James R. Downing Photographs: Hetherington Photography Illustrations: Roxanne LeMoine; Lorna Johnson

WOOD MAGAZINE WINTER 1998

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Dresser and Mirror

Continued from page 67

4. Follow Step 3 on the drawing on page 67 to cut a ⅛" rabbet ¼" deep along the ends of the drawer backs (V, W, X).

5. Refer to Step 4 on the drawing to machine the mating dadoes on the drawer sides (S, T, U).

6. Cut the remaining grooves in the drawer fronts and sides where dimensioned on the Drawer drawing to house the plywood bottoms (Y, Z). Make sure the groove width is the same as the thickness of the plywood you will be using for the drawer bottoms.

7. Cut the drawer bottoms (Y, Z) to size from ¼" plywood.

8. Dry-clamp (using no glue) each drawer together to check the fit. To assemble each drawer, use white glue. It dries more slowly, giving you more working time. Glue one front piece to one side piece. Add a drawer back, slide the bottom in place, and glue the other side in place as shown in Photo C. Clamp the assembly together, taking opposing diagonal measurements from the corners to check for square.

9. After marking the locations, drill the holes in the drawer fronts to accept the hardware. Be careful to locate the holes consistently from one front to another.

10. To create the look of an equal reveal on the top and bottom of each drawer when it's slid in place in the dresser, rout the bottom edge of each drawer front with a 15° chamfer (bit we used a CMT 857.503.11). You also could sand or plane the 15° chamfer along the bottom edge of each drawer front. See the Drawer drawing for reference. The key is to keep the chamfered edge straight.

11. Cut the drawer stops (AA) to size, and drill a countersunk mounting hole in each.

Now finish your showpiece dresser

1. Measure the opening, and rip and crosscut the back (BB) to size from ¼" plywood.

2. Finish-sand the carcase, drawers, and top. Finish the cabinet as desired. See the country-finishing article on page 72 of the December 1998 issue of WOOD magazine for our country finish. Or stain the cabinet and drawer fronts and protect them with a clear finish for the look of the dresser on page 64.

3. Attach the self-adhesive, self-lubricating nylon tape (see the Buying Guide for our source) where shown on the Exploded View drawing.

4. Slide the drawers into their respective openings, and screw the stops in place.

5. Mark the screw locations, drill the countersunk holes, and screw the back (BB) into place.

---

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Written by Marlen Kemmer
Project Design: Jeff Hayes
Illustrations: Roxanne LeMaire; Lorna Johnson
Photographs: Hetherington Photography

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WL-1060 1/4" 12.
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WL-1200 1/2" 15.
WL-1201 1/2" 16.
WL-1202 1/2" 17.
WL-1203 1/2" 18.

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WL-1254 5/32" 23.

Pattern Cutting Bit
1/4" Shank • Diameter
WL-1300 1/4" 24.
WL-1301 1/4" 25.
WL-1303 1/4" 27.
WL-1304 1/4" 28.

Chamfer Bits
1/4" Shank • Degree
WL-1350 1/4" 29.
WL-1351 1/4" 30.
WL-1352 1/4" 31.
WL-1353 1/4" 32.
WL-1354 1/4" 33.

Core Box Bits
1/4" Shank • Diameter
WL-1360 1/4" 34.
WL-1361 1/4" 35.
WL-1362 1/4" 36.
WL-1363 1/4" 37.
WL-1364 1/4" 38.

Straight Bits
1/4" Shank • Diameter
WL-1400 1/4" 39.
WL-1401 1/4" 40.
WL-1402 1/4" 41.
WL-1403 1/4" 42.
WL-1404 1/4" 43.

Roundnose/Core Box
1/2" Shank • Diameter
WL-1500 1/2" 44.
WL-1501 1/2" 45.
WL-1502 1/2" 46.
WL-1503 1/2" 47.
WL-1504 1/2" 48.

Bullnose Bits with Bearing
1/4" Shank • Bead Opening
WL-1550 1/4" 49.
WL-1551 1/4" 50.
WL-1552 1/4" 51.
WL-1553 1/4" 52.
WL-1554 1/4" 53.

Rabbeting Bits
1/4" Shank • Kerf
WL-1600 1/4" 54.
WL-1601 1/4" 55.
WL-1602 1/4" 56.
WL-1603 1/4" 57.
WL-1604 1/4" 58.

Bowl & Tray Cutter
1/4" Shank • Diameter
WL-1650 1/4" 59.
WL-1651 1/4" 60.
WL-1652 1/4" 61.
WL-1653 1/4" 62.
WL-1654 1/4" 63.

Dado & Planer Bit
1/4" Shank • Diameter
WL-1700 1/4" 64.
WL-1701 1/4" 65.
WL-1702 1/4" 66.
WL-1703 1/4" 67.
WL-1704 1/4" 68.

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WL-1800 1/4" 69.
WL-1801 1/4" 70.
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WL-1803 1/4" 72.
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For eyes and ears, the Opti-Muff has you covered

I know full well that I should wear my safety glasses and hearing protection when I work with power tools. But earmuff-type protectors grind the bows of the safety glasses into my head, so I end up choosing between protecting my eyes or my ears. No more—the Opti-Muff protects them both.

To pull off this nifty trick, the Opti-Muff has safety lenses attached to the muff by means of adjustable bows. These bows position the lenses to protect your eyes regardless of the size or shape of your face. I found I could easily flip the lenses out of the way when I needed to, while still protecting my ears. And, with its 26 decibel noise-reduction rating, the Opti-Muff protects your ears while still letting you sense the load on a power tool’s motor.

If you already wear eyeglasses, get the model that fits over your prescription glasses. Because of the way they fold, they take up no more space in your shop than ordinary muffs.

—Tested by Dave Henderson

PRODUCT SCORECARD

<table>
<thead>
<tr>
<th>Product: Opti-Muff Stock #128124</th>
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<tbody>
<tr>
<td><strong>Performance</strong></td>
</tr>
<tr>
<td>★★★★★</td>
</tr>
<tr>
<td><strong>Price</strong></td>
</tr>
<tr>
<td>$34.99 plus $6.99 for shipping &amp; handling</td>
</tr>
<tr>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>★★★★★</td>
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</tbody>
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These jigsaw blades stand by you through thick and thin

It seems like whenever I want to cut wood with my jigsaw, it has the metal-cutting blade in it. Then it seems I can never find the blade with the right tooth count for the thickness of wood I want to cut, so I have to make do with the wrong size blade. The folks at Bosch have created a jigsaw blade, called the Progressor T345XF, that cuts metal as well as wood, and thick stock as well as thin.

The unique Progressor blade has more teeth per inch (tpi) as you get closer to the shank. So, when cutting thin wood or sheet metal, the blade is the best at 12 tpi. When cutting thick stock, the same blade cuts with a more aggressive 6 tpi.

And cut it does. I started my test by cutting curves in a pressure-treated 4x4, then in 3/4” oak. The blade easily followed even the tightest curves. Next, I sliced into a pine 2x6 loaded with framing nails, and the blade effortlessly buzzed through even the nails. Finally, I cut through aluminum tubing and 1/8” steel plate. In fact, I made a dozen cuts through the steel plate with the Progressor and each cut went as fast as the first. After putting the blade through everything I could find in the shop, I did discover some minor tooth damage, but the blade still cut like new.

One caveat: The blade’s wide set (the alternating left and right bend of the teeth) helps the teeth cut aggressively, but also contribute to slightly rough sawn surfaces. It also tends to tear out the top of the cut more than a blade with a less radical set. Make a test cut first to see if the smoothness of the final cut will be acceptable.

—Tested by Bob McFarlin

PRODUCT SCORECARD

<table>
<thead>
<tr>
<th>Progressor T345XF Jigsaw Blades</th>
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</thead>
<tbody>
<tr>
<td><strong>Performance</strong></td>
</tr>
<tr>
<td>★★★★★</td>
</tr>
<tr>
<td><strong>Price</strong></td>
</tr>
<tr>
<td>about $16 for five blades</td>
</tr>
<tr>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>★★★★★</td>
</tr>
</tbody>
</table>


Continued on page 90
Less clamp pressure with a twist of the wrist

How can you improve on the old reliable spring clamp? Well, the folks at Adjustable Clamp Company found a couple of ways to better it with their Pony Adjust-a-Clamp.

Let's say you're working with a fragile wood such as balsa. A regular spring clamp will literally crush your work. With the Adjust-a-Clamp, you can lessen the clamping pressure to as little as one pound, by turning an adjustment screw between the handles.

You'll like these clamps if arthritis or injury have ever hampered your clamping. When my tennis elbow flares up, I can't squeeze a normal spring clamp to save my life. But, with the Adjust-a-Clamp, I loosen the tension, put the clamp where I want it, then crank the tension back up with a screwdriver. It works without fail.

The other improvement I like is the pivoting plastic jaws on the Adjust-a-Clamp. They're much better than the old plastic-coated steel jaws because they have more clamping surface, and they won't pull your work out of alignment.

—Tested by Bob McFarlin

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Ball bearings give this sign router its smooth moves

Like most other sign routers, the Woodworker Machine Model J-20 employs a pattern follower (a stylus) linked to a router. As you trace the stylus along a two-dimensional pattern, the router cuts the figure into wood.

Smooth ball-bearing action sets the J-20 apart from other sign-routing devices. I found router movement smooth and almost effortless.

On this machine, the router base and stylus move fore and aft on a carriage, which itself travels side to side along a rod across the back of the machine. Total travel is 14" fore and aft and 24" side to side. The J-20 handles stock up to 12" wide.

I tried my hand at several pine and cedar signs, using the 2"-high CNC-cut phenolic block letter templates furnished with the machine. (You can buy other sizes from 1½-4") I was pleased with the results—the routed letters and numbers came out sharp and uniform.

I found the machine less capable when attempting to rout a sign in oak. I had to pay close attention to controlling the router due to flexing in the guide rods. (Jerry Kimball of the Woodworker Machine Center later told me that the J-20 isn’t intended for hardwood routing.)

The company offers the machine with a 1½-hp router or a laminate trimmer. (I recommend going with the smaller, lighter laminate trimmer for ease of use.) You can also buy the J-20 without a router. An effective dust-collection attachment is available, too. The instructions show operation clearly, and also tell you how to use the machine to print cards, signs, and banners with felt-tip markers.

The manufacturer touts the Woodworker Machine as the foundation of a home-based business. In view of its price, it would be easier to justify buying one on those grounds rather than for occasional hobby use.

—Tested by Dave Henderson

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**Products That Perform**

Continued from page 94

Twist and snap, change your router bit

I really like telling you about items that make woodworking easier, so I love reporting on the Eliminator RC router collet for Porter-Cable routers with 1/2" collets. Though not too less, the Eliminator has a simple hex-head screw, which acts on a pair of wedge-shaped keys in the chuck, to hold router bits fast. Slide the bit in, turn your hex-head wrench a full turn, and it’s locked. Changing bits is a one-handed job.

But does it work? To test for bit slippage, I ran a gamut of bits, from a straight pattern bit up to a big panel-raiser, in oak and hard maple, intentionally trying to get the bit to slip. Even when I jammed the panel bit running at 12,000 rpm, I found not a hint of slippage.

To replace the original equipment collet with The Eliminator, just thread the old collet off, and the new one on. An optional adapter sleeve for 1/4" bits slips right into the 1/2" collet, and it grips just as well.

I found only one difficulty with the Eliminator: When the hex-head screw lines up with the router base, a T-handle driver can’t get to it. You can change your router depth to change bits, or go to an auto-supply store and get a 1/4" hex balldriver. It turns the screw from just about any angle—very handy when using it in a router table.™

—Tested by Dave Henderson

**Product Scorecard**

The Eliminator RC for Porter-Cable routers with 1/2" collets

**Performance**
- 1/2" collet, $55 at home center.
- Hex adapter, $12.

**Value**
- Tested by Dave Henderson.


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Sycamore
The hardwood giant of the virgin forest

Although few woodworkers become acquainted with the wood of the American sycamore (*Platanus occidentalis*), that wasn’t always so. Back when the United States was still a new nation, and its western frontier was just beyond the Allegheny Mountains, sycamore was the giant of the forest. It wasn’t uncommon for pioneers in the Ohio River Valley to come upon huge sycamores. In 1802, one growing on an island in the Ohio River measured 13’ in diameter 4’ above the ground. Such old, large trees were usually hollow, and thriving despite the malady.

For some purposes, the hollowness made the tree all the more desirable. A frontier farmer would fell the hollow sycamore, then crosscut it to appropriate lengths. By nailing on bottoms of tightly joined boards, the industrious plowman had grain-storage containers. Left standing, hollow sycamores also were handy for stabling goats, pigs, and other livestock until a shelter could be built for them. And how many wandering woodsman might have found refuge in a hollow sycamore?

Although hard, tough, and resistant to splitting, sycamore posed some difficulty in drying. That’s why it was used only on a limited basis for shipping trunks, piano and organ cases, washing machine bodies, and pails. It also was the choice for countertops and chopping blocks in butcher shops because it withstands the relentless punishment of cutting edges.

While still the largest hardwood tree of American forests, yesterday’s giants have long fallen. If you do spy an elderly sycamore, bang on it. The trunk may resonate with historic hollowness.

Illustration: Jim Stevenson
A common bond

To some, the internet can be a jungle. But every once in a while, really good things happen.

Last April, Hugh Hadfield of Fairview Heights, Illinois, a contributor to the discussion group at WOOD ONLINE® (www.wood-magazine.com) read some sad news. Liz Peterson, wife of Perry, Iowa, woodworker and fellow internet participant, Robert, was diagnosed with malignant brain tumors. Hugh had never met Robert, except through numerous postings on WOOD ONLINE, but his heart went out to the couple. What could be done to help them through the months ahead?

Hugh and 15 cyberspace volunteers—all online contributors—decided on a hand-crafted gift as a show of concern and best wishes. Another 10 contributed toward expenses. The gift, a set of hand-crafted wooden “books” containing messages, a bookcase for Robert, and a server/tray for Liz, see above, was delivered in June. The Peterson’s were overwhelmed and buoyed by these strangers’ support, whose only bond was wood.

Folk marquetry on exhibit

Until January 10 you can view a first-time exhibit of American folk marquetry at New York City’s Museum of American Folk Art. The intriguing show is called “Masterpieces in Wood: American Folk Marquetry from the Hirschorn Foundation.”

Marquetry was long practiced in Europe, then brought to the Colonies, and traditionally was the work of artisans inlaying veneers of different wood species in patterns on classical cabinets and other fine furniture. Although folk marquetry follows many of the same techniques, it’s mainly the work of ordinary people on everyday items. Makers of these items have been identified as sailors, farmers, and even prisoners.

These skilled craftsmen used marquetry to embellish, beautify, and transform the ordinary into the extraordinary. Working in their spare time after their normal jobs were over, they created pieces so exquisite and time-consuming that no one could afford to pay for them. So most items in the exhibit were gifts to loved ones, expressing an investment of time and emotion.

You’ll find the Museum of American Folk Art at Two Lincoln Square. For more information and exhibit hours, call the museum at 212/595-9533 (www.folkartmuse.org).

Although the maker is unknown, this circa 1930 violin case exemplifies the meticulous, handcrafted detail found in folk marquetry.
So you've got your project just two steps from completion - sanding and finishing. You're so excited and you head for your supply cabinet - but what do you find? You're out of sandpaper!! Now the project has to be put off for another couple of days while you round up the proper sanding product.

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